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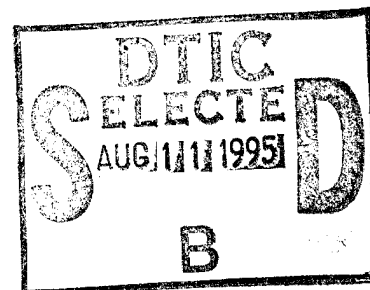
**TECHNICAL REPORT  
NATICK/TR-95/029**

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# **AN ANALYSIS OF NAVY FOOD SERVICE EQUIPMENT MANAGEMENT AFLOAT PHASE I - SURVEY RESULTS**

**By  
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**August 1995**



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## PREFACE

The Sustainability Directorate (SusD) at the U. S. Army Soldier Systems Command (SSCOM) Natick Research, Development and Engineering Center (NRDEC) prepared this analysis to assist in developing new food service equipment management concepts for Navy ships.

This project was conducted as part of the Department of Defense Food and Nutrition, Research, Development, and Engineering Program. The work outlined was performed under Military Service Requirement N 95-14 "Navy Food Service 2000, Task 2 - Food Service Equipment Management Study". This report covers the period 1 October 1990 through 30 November 1994. A final report will be prepared at the conclusion of this project, scheduled for 30 September 1995.

The sponsor for this effort was the Naval Supply Systems Command, Food Service Division (SUP51), the former Navy Food Service Systems Office (NAVFSSO).

The Program Manager for this effort was Mr. Brian Hill and the Project Manager Ms. Janice Rosado of NRDEC's Sustainability Directorate. The authors wish to thank the following individuals for their valuable contributions:

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## EXECUTIVE SUMMARY

This report provides an analysis of current methods used by the U.S. Navy to manage its shipboard food service equipment and outlines alternatives to standardize equipment management practices across the fleet.

The Navy does not have a standardized fleetwide program for managing its shipboard food service equipment. There are a number of instructions/standards designed to assist crew members in maintaining, repairing and replacing their equipment. Some are for fleetwide use, while others are administered by the individual fleet or type command. For example, the carrier fleet has developed its own program, the Enhanced Quality of Life Program (EQOL), specifically to aid in the management of food service (and laundry) equipment.

This Military Service Requirement, the Food Service Equipment Management Study, was undertaken to review current programs and practices used across the fleet and to develop alternatives that would allow for a standardized method for equipment management that the Navy could implement fleetwide. To this end, extensive data collection visits were conducted to obtain background information on how the individual type commands and ships manage their equipment. As a result of this research, an extensive survey was developed and distributed to food service and engineering personnel on board Navy ships. The survey focused on the areas of equipment maintenance, repair, replacement and training. With the tremendous support received by the type commands, a return rate of 40% was achieved, with 125 ships participating and a total of 517 questionnaires returned. Upon completion of the survey analysis, two preliminary alternatives were developed for the Navy regarding equipment management. The results of the survey and the alternatives are presented in this report.

The survey results indicated that three key areas need to be addressed: communication, parts support and training. The reasons behind these conclusions are as follows. While foodservice equipment is used by Food Service personnel, it is maintained by the Engineering Department. Miscommunication between the two departments can result in ineffective management of the equipment. Additionally, breakdowns in the communication between the ship and the ashore supply channels are frequent thus causing delays in equipment support. Lack of timely parts support from ashore supply channels was a primary concern. When the normal supply channels cannot respond in an effective and timely manner, the crew will often circumvent the system exacerbating an already difficult situation. Lack of training in both equipment operation and maintenance was another key deficiency identified by the survey.

Two preliminary alternatives were developed based on the survey findings to address the management of food service equipment on board Navy ships. The first alternative, to be managed by the fleet and type commands, addresses all aspects of equipment management including maintenance, repair, replacement, program support and training. The second alternative, which would be managed by the individual ships, entails a modular approach with a focus on training.

It is anticipated that the implementation of either program would provide cost savings and increase readiness and morale in the area of food service.

# AN ANALYSIS OF NAVY FOOD SERVICE EQUIPMENT MANAGEMENT AFLOAT PHASE I - SURVEY RESULTS

## INTRODUCTION

The Navy Food Service Equipment Management Study is being conducted as part of the DoD Food and Nutrition Research, Development and Engineering Program as Task 2 of the Navy Food Service 2000 Project (Military Service Requirement N 95-14). This interim report covers the period from the start date, October 1992 through November 1994. The statement of requirement as submitted by the Navy is as follows:

The need exists for an improved method for managing/replacing food service equipment for afloat vessels. Currently, shipboard personnel are responsible for evaluating the need to replace/upgrade equipment and arrange to have it changed out during a pierside availability period. This system adds to an already burdensome management problem for afloat activities and contributes to nonstandard and unauthorized equipment being installed aboard ships throughout the Navy. A cost/feasibility analysis needs to be conducted to assess potential total cost savings for the Navy by implementation of a standardized Phased Renovation Replacement Program (PRRP) which would be managed by all six Type Commanders.

The initial approach was for Natick to conduct a cost/feasibility analysis to determine potential cost savings from the implementation of a standardized fleetwide food service equipment management program. The envisioned program was to encompass all aspects of equipment management including maintenance, repair and replacement. Preliminary investigations indicated that management programs/practices differ widely throughout the fleet, the type commands (tycoms) and the individual ships. The project team and the Navy sponsor deemed it necessary to restructure the program due to these widely divergent equipment management practices. The revised approach, as coordinated with the Naval Supply Systems Command, Code SUP 51, Food Service Division\*, called for the development and execution of a survey of Navy food service and engineering shipboard personnel, to determine the extent and perceived effectiveness of the current system. The results of the survey are the basis of this interim report.

\* Naval Supply Systems Command (SUP 51) supersedes the former Navy Food Service Systems Office (NAVFSSO) effective 1 Jan 95.

### **Objective**

The objective of the effort being described was to assess current procedures and identify factors related to the effective maintenance, repair, and replacement of food service equipment aboard Navy ships; alternatives would be developed that would lead to increased efficiency through improved manpower utilization, reduced operation and support costs, and enhanced readiness.

### **Approach**

A systems analysis of current food service equipment programs and practices was conducted to define system parameters of food service equipment management at all levels, from the type commands down to the individual ships. As part of this effort, interviews were conducted with representatives of the individual type commands and discussions were held with shipboard food service and engineering personnel during a number of ship visits. From these interviews a survey was prepared and administered fleetwide to shipboard food service and engineering personnel. Alternatives were developed based on the results of the survey.

## DESCRIPTION OF THE CURRENT SYSTEM

To develop a detailed understanding of the current system, background information on the Navy command structure and food service equipment management practices was obtained. A number of meetings were held and telephone interviews conducted with the people actively involved in food service from the fleet down to the individual ship as well as with the various support organizations.

Navy ships are first divided by fleet and are subsequently grouped by ship types and assigned to type commanders (tycoms) for purposes of administration. The NRDEC team focused on the U.S. Atlantic (CINCLANT) and Pacific (CINCPAC) Fleets and their individual air, surface and submarine type commands as delineated below:

COMNAVAIRLANT	- Commander, Naval Air Force, U.S. Atlantic Fleet
COMNAVAIRPAC	- Commander, Naval Air Force, U.S. Pacific Fleet
COMNAVSURFLANT	- Commander, Naval Surface Force, U.S. Atlantic Fleet
COMNAVSURFPAC	- Commander, Naval Surface Force, U.S. Pacific Fleet
COMNAVSUBLANT	- Commander, Naval Submarine Force, U.S. Atlantic Fleet
COMNAVSUBPAC	- Commander, Naval Submarine Force, U.S. Pacific Fleet

Naval supply begins with the Naval Supply Systems Command (NAVSUP). NAVSUP has overall responsibility for supply management policies and methods, material support functions, supply management functions, transportation of Navy property, R&D efforts associated with material/equipment procurement of selected materials/services, technical guidance with respect to the preparation and service of food in galleys, and providing assistance in planning and layout of supply spaces ashore and afloat. Further policies and support are provided at the fleet and tycom level by Supply Corps officers. At the individual ship level there is a Supply Department Head responsible for all supply functions including material support and service functions. Food service is only one of many supply support functions.

Material and parts support is provided through a combination of the Navy supply system and the integrated (DoD wide) supply system. Management support specific to food service is provided fleetwide by the Navy Food Management Teams (NFMT). Additionally, the individual tycoms have established various support programs/teams.

A combination of interview techniques were used including both face-to-face and telephone interviews to develop a basic understanding of how ships manage their food service equipment, how they are organizationally structured, and to determine who would be affected by any change in operating procedures. The interviews provided the background information necessary for the development of a fleetwide equipment management survey, to be distributed to ship's food service and engineering personnel. Highlights of these preliminary investigations are provided below.

**COMNAVAIRPAC** : The Phased Renovation and Repair Program (PRRP) was established by COMNAVAIRPAC in 1985 to improve operational efficiency and maintenance and repair of aircraft carrier (CV) supply department and habitability functions through advance planning. As originally structured it was to consist of the following five modules:

(1) Provide improved/enhanced advance planning support for aircraft carrier supply departments during scheduled shipyard availability periods specifically for maintenance and repair support for food service and laundry equipment.

(2) Provide material pre-positioning to support a phased approach to repair and replacement of habitability equipment.

(3) Provide a five-year plan for the phased (scheduled) replacement of selected equipment and major renovation of selected ship compartments.

(4) Provide regional and area contracting support for small scale equipment.

(5) Provide interior design services including engineering studies and fully developed drawings for renovation work.

AIRPAC provides overall coordination for the West Coast PRRP program. Program execution is the responsibility of the Naval Sea Systems Command, Office of Planning and Engineering Repair Aircraft Carriers (PERA CV) in Bremerton, WA. The PRRP team at PERA CV provides for overall coordination for the program, acting as a liaison between the ship, type command, and the shipyard. PRRP also oversees contracts for the design and installation work associated with compartment renovations. Funding for the program is provided by AIRPAC from the aircraft carrier's Operational Target Allowance (OPTAR) funds.

The PRRP office has four individuals who interface directly with shipboard personnel to assess their equipment needs and effectively plan equipment repairs/replacements and compartment renovations. The PRRP staff is responsible for ordering equipment so it is readily available for installation during the next scheduled availability.

At the onset of the PRRP program a data base of all food service and laundry equipment was established for each of AIRPAC's carriers. This data base includes scheduled replacement of equipment and tracks equipment ordered for this purpose. The data base has recently been integrated with the Weapons Systems File.

The PRRP program schedules equipment replacements under the Carrier Availability Planning System (CAPS). The system includes the ordering and warehousing of replacement equipment, a physical inventory and status report of the ship's food service and laundry equipment, installing new equipment, and updating the data base. Similarly, PRRP plans and

executes compartment renovations. Typically, 10 compartments will be renovated during short availabilities and up to 20 compartments during longer availabilities.

The PRRP staff is a valuable asset for the carrier's supply officer. In addition to the planned replacements and renovations, the staff are available to provide technical support to the ships. Although PRRP is not actively involved in equipment maintenance and repair, they do provide expert advice as to what may need to be done and possible sources of support. PRRP will provide emergency replacements as needed and help prepare a ship for deployment. The staff may also act as liaison with equipment manufacturers, helping to solve inherent problems, field new equipment, insure shipboard standards are met, and equipment is properly installed.

The AIRPAC PRRP program has undergone a number of changes in the past few years. The above synopsis provides a historical perspective of the program based on discussions held in February 1993 and may not be in line with current operating procedures.

**COMNAVIAIRLANT:** AIRLANT's Enhanced Quality of Life (EQOL) program was established in 1990 to address systemic problems with sculleries and laundries. The AIRLANT program historically differs from their AIRPAC counterpart in that their focus is on equipment repair rather than replacement and renovation. Through a contracted effort, AIRLANT offers on-site training to the shipboard food service and engineering department personnel. Their objective is to provide ship's personnel with the knowledge needed to keep their equipment running. This is particularly important when ships deploy and the EQOL staff is not readily available. The EQOL program is funded by money from the ship's OPTAR funds. Three visits are scheduled for each ship. Following a ship's 30-day standdown period, the EQOL team conducts a survey of all galley and laundry equipment, making assessments of the ship's needs. In a second visit, repairs are made and training is provided. A follow-up visit is conducted one month prior to deployment. The EQOL team ensures that appropriate and cost effective decisions are made regarding the ship's galley and laundry equipment. To prevent non-authorized food service equipment from being purchased, equipment replacement has become a centralized function that is carried out under the EQOL program. At an EQOL briefing presented as part of the "Prospective Supply Officers Conference" in May 1993, the program was fully endorsed by the supply officers in attendance.

**PRRP/EQOL Reorganization:** During the fall of 1993, AIRLANT and AIRPAC decided to combine the efforts of the PRRP and EQOL programs under one directive. As part of this effort the name of AIRPAC's program was changed from PRRP to EQOL. The key objectives of the Enhanced Quality of Life Program (EQOL) as stated in COMNAVIAIRLANTINST 4700.1 and COMNAVIAIRPACINST 4700.1G follow:

- Advance planning assistance.
- Technical expertise and continuity.
- Standardization of approved shipboard food/hotel service equipment.

- Achievement of full APL supportability.
- Maintenance and grooming support planning.

**CINCLANTFLEET:** Natick organized a meeting to be held in Norfolk, VA at Commander in Chief, Atlantic Fleet (CINCLANTFLEET) Headquarters in January 1994 to discuss food service equipment management and the upcoming survey. Supply department representatives of CINCLANTFLEET, SURFLANT, and AIRLANT and the Norfolk Food Management Team (NFMT) were in attendance. The representative from SUBLANT was unable to attend, but sent his comments. Additionally, as part of this effort Natick met with a representative of the Readiness Support Group (RSG), had an in-depth discussion with members of the NFMT and conducted three ship visits to discuss equipment management issues with both supply/food service and engineering personnel. The ship visits included the USS Eisenhower (CVN-69), the USS Barry (DDG-52) and a four-day underway period on the USS Puget Sound (AD-38). The following is a non-prioritized synopsis of the central issues and concerns raised regarding food service equipment management during these meetings.

#### Equipment/Parts:

- Equipment standardization was discussed with a focus on how to provide standardization while maintaining flexibility and responsiveness.
- Warranties are underutilized and should be addressed.
- Commercial equipment is not supported by the supply system and therefore parts are not readily available.
- Identifying, procuring, and stocking parts are all issues.
- The equipment ordered is often replaced by a generic model that doesn't meet the ship's specific requirements. Examples include receiving equipment that does not fit into the designated space and does not conform to the electrical requirements.
- The paperwork process for the logistics support of new equipment was perceived to be too slow, which negatively impacts on the availability of parts.
- Lack of equipment standardization has an adverse effect on both training and parts support.

### Technical Support:

- SURFLANT lacks a coordinated effort like the EQOL program. Such a program was considered beneficial.
- Ships tend to become dependent on the EQOL team. Ships put off repairs until they are back in port and the EQOL team can provide assistance. Future initiatives should address this concern.
- Assist visits are a valuable tool for both Food Service and Engineering.

### Training:

- Training in food service equipment repair is lacking for engineering personnel.

### Communication/Working Relationships:

- Communication is an issue, both internally on the ship and externally within the Navy/DoD.
- The relationship between the Supply/Food Service and Engineering Departments is considered to have a major impact on the maintenance/repair of food service equipment.
- There is often a feeling of "unionization" within the Engineering Department, that is, each division feels responsible solely for their area of expertise. This lack of teaming negatively impacts equipment repair.
- Since food service equipment is operated and maintained/repared by two separate departments, there is a lack of real ownership.
- Consistency of repair is a common problem. If different individuals within an engineering department are sent to repair a piece of equipment, then it is hard to track its repair history and to efficiently diagnose and repair it.

### Financial Considerations:

- Due to financial constraints, a shift has recently been made to focus on repairing equipment rather than having scheduled replacements .
- A dedicated galley maintenance team was discussed. Although considered a good idea, manning would need to be addressed.

**CINCPACFLEET:** Meetings were held with representatives from the San Diego Food Management Team, AIRPAC, SURFPAC, and the Afloat Training Group (ATG). Also, four ship visits were made and discussions were held with food service and engineering personnel. Ship visits included the USS John Paul Jones (DDG-53), the USS John H. Sides (FFG-14), the USS Constellation (CV-64) and the USS Portsmouth (SSN-707). A non-prioritized summary of the issues discussed follows.

#### Equipment/Parts:

- Food service equipment needs to be standardized for a number of reasons including parts support and training.
- To avoid equipment deficiencies during shipbuilding leadtime on equipment purchases needs to be reduced. Currently, equipment is warehoused and is often obsolete by the time it is put to use on a ship.
- Engineering stated they need to have more parts available through the Navy supply system to prevent the need to order via open purchase.
- Food Service should be treated as a total system.
- Logistics support needs to be considered when ordering new equipment.
- Poor quality and obsolete equipment need to be purged from the Navy/DoD Supply Systems. The current method of reporting deficiencies requires extensive paperwork.
- Lack of training, as well as the lack of parts, may result in equipment being jury-rigged without regard to safety.

#### Technical Support:

- Technical manuals need to differentiate between commercial and shipboard designated parts.
- Having open-ended maintenance contracts is a distinct advantage to having to go out on bid each time.
- There is some redundancy on assist visits from the various organizations. We need to better utilize these resources. (For example, Navy-wide teams such as the Food Management Team and tycom teams should work hand-in-hand).
- A suggestion was made to manage a fleetwide program by ship class.

### Training:

- Training for cooks on equipment operation and problem identification is needed. Early intervention will help to prevent the need for emergency repairs.
- Engineers need training specific to galley equipment.
- A concern was expressed that the increased sophistication of equipment makes it more difficult for an already undertrained crew to maintain.
- There is a lack of support for food service training for engineering department personnel.

### Communication/Working Relationships:

- SURFPAC has a number of ships home ported overseas and it is difficult to provide service due to the geographical distance.
- The procurement system needs to clearly indicate when equipment is being ordered for shipboard use. This will help to ensure that only shipboard-approved equipment is being purchased.
- Equipment managers need to improve networking skills. Often there is equipment already available within the system, but buyers are not aware of its existence.
- Multi-disciplined teams (equipment specialists, engineers, MS's, architects, etc) need to be established throughout the entire equipment management process, taking a cradle to grave approach to the layout, purchase, maintenance, repair and disposal of all food service spaces and equipment.
- There is a need to clarify who is responsible for equipment requisition and who is responsible for equipment maintenance.
- Food Service needs to take a more active role in their equipment's preventive maintenance. They need to ensure appropriate maintenance is performed in a timely manner. Sometimes equipment is replaced and the maintenance card is not updated. This can result in improper maintenance - either too much, too little or the wrong kind.

A survey on food service equipment maintenance, repair, replacement, and training was developed based on the above interviews.

## NAVY FOOD SERVICE EQUIPMENT MANAGEMENT SURVEY

### Survey Methodology

**Survey Development:** A fleetwide survey of shipboard food service and engineering personnel was conducted to collect data on current food service equipment management programs/practices and to identify future needs. The survey was based on discussions with Navy personnel involved in managing, assessing, and inspecting shipboard food service operations. In order to validate the questions, the draft survey was distributed to points of contact within Naval Supply Systems Command (SUP 51); Commander Naval Forces, Atlantic, (COMNAVLANTFLEET); Commander Naval Forces, Pacific (COMNAVPACFLEET); Naval Air Force, Pacific Fleet (AIRPAC); Naval Air Force, Atlantic Fleet (AIRLANT); Naval Surface Force, Pacific Fleet (SURFPAC); Naval Surface Force, Atlantic Fleet (SURFLANT); Naval Submarine Force, Pacific Fleet (SUBPAC); Naval Submarine Force, Atlantic Fleet, (SUBLANT); the San Diego Food Management Team; the Afloat Training Group, Pacific; the Naval Surface Warfare Center (NSWC); and the Naval Sea Systems Command (NAVSEA) for comment. Their input was assimilated into the final survey prior to distribution. A copy of the survey is provided in Appendix A.

**Survey Distribution:** The surveys were distributed in two phases. The first phase was limited to the 12 aircraft carriers in order to check the proficiency of the survey and allow for modifications prior to distributing to the rest of the fleet. Upon review of this first phase of surveys it was determined that no changes to the questionnaire were required. Surveys were then sent to the remaining ships. In all cases the surveys were sent out by the type commands with a cover letter establishing command support for the survey. AIRLANT, AIRPAC and SUBPAC collected and returned the surveys to Natick while the remaining tycoms, SURFLANT, SURFPAC and SUBLANT, had the ships mail their results directly to Natick.

A total of 1320 surveys were sent out to be completed by, at a minimum, one representative from food service and one from engineering from each ship. Distribution is shown below. The number of surveys sent to each ship depended on the ship's complement and the recommendation of the type commanders.

AIRLANT -	48 surveys distribution 8 each/6 carriers
AIRPAC -	48 surveys distribution 8 each/6 carriers
SURFLANT -	600 surveys distribution 5 each/120 ships

<b>SURFPAC -</b>	400 surveys distribution 5 each/80 ships
<b>SUBLANT -</b>	126 surveys distribution 6 each/3 tenders and 2 each/54 subs
<b>SUBPAC -</b>	98 surveys distribution 6 each/3 tenders and 4 each/20 subs

**Survey Analysis:** In the initial data analysis, frequency of responses was performed for each of the closed-ended survey questions. These results were tabulated and are presented in the tables that follow. For the open-ended questions, an alphabetical listing of the responses was prepared. In preparing the listings it was necessary in some cases to truncate the responses due to limitations in the data entry program. These listings are on file at NRDEC and are summarized in the text of this report.

Five major sub-analyses were carried out to determine if there were differences among the various groups of respondents. The five groups and their subdivisions are as follows:

<b>Type of Ship:</b>	Aircraft Carrier Surface Vessel Submarine
<b>Fleet:</b>	Atlantic Pacific
<b>Grade:</b>	Officers Enlisted
<b>Department:</b>	Supply Engineering
<b>Experience:</b>	1-3 Years of military service > 3 Years of military service

For each analysis the data were divided into their respective sub groups. For each question, except for open-ended questions, a Pearson's Chi Squared ( $\chi^2$ ) test for independence was used to identify whether responses between the groups differed. Only questions where there was a significant difference ( $\alpha = 0.05$ ) between the groups were reported.

## **Survey Results**

The following provides the results of the Navy Food Service Equipment Management Survey. The survey included a number of open ended questions which resulted in extensive written responses. A summary of the results of these questions has been provided in the tables and text that follows. The original surveys and a complete compilation of the responses to the open-ended questions are on file at NRDEC.

### **Demography of Respondents**

#### **Number and Distribution of Responses by...**

##### **Home Port of Ships:**

Approximately 125 ships responded to the survey with a total of 517 questionnaires returned. Thirty-nine percent of the ships responding were from ships with their home port on the West coast and 61% with their home port on the East coast. Figure 1 shows the number of ships responding by their respective home ports. Since the number of surveys returned per ship varied, there was an even higher representation of the East coast when looking at the total survey count, 65%, as compared to 35% for the West coast.

Figure 2 compares the number of Atlantic and Pacific Fleet ships responding to the survey with the actual number of active ships. There is a greater representation by the Atlantic Fleet. Figure 2 also shows the total number of ships returned from each fleet since the number of surveys returned per ship varied. Again, the Atlantic Fleet shows a greater response rate.

##### **Type of Ship:**

All major types of ships are represented in the survey responses. Table 1 lists the type of ship with the number of responses received. The sample is, for the most part, representative of the ship types within the Atlantic and Pacific fleets when one takes into consideration the number of surveys returned and both the number of ships and population for those ships.

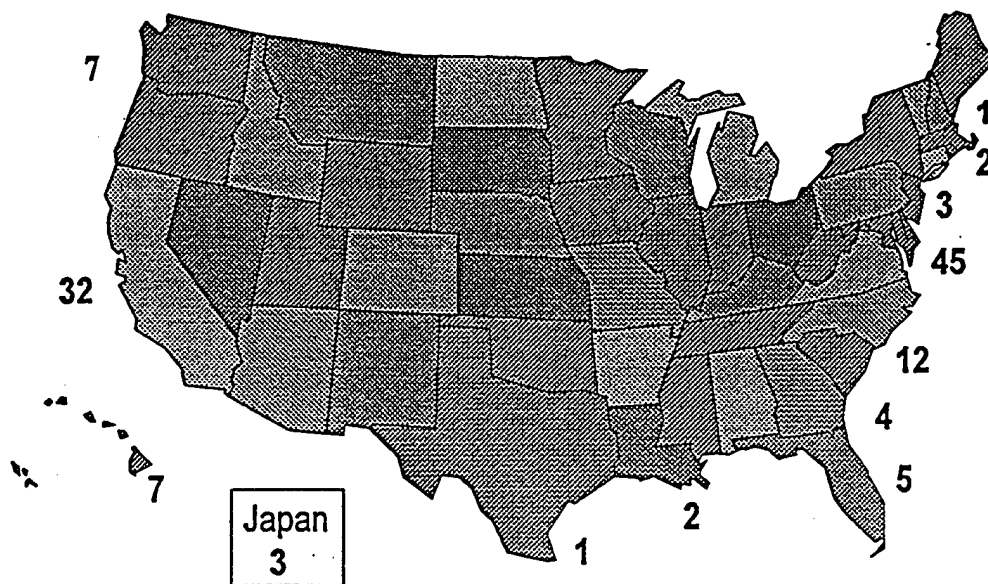


Figure 1. Distribution of Ships by Homeport (N=125)

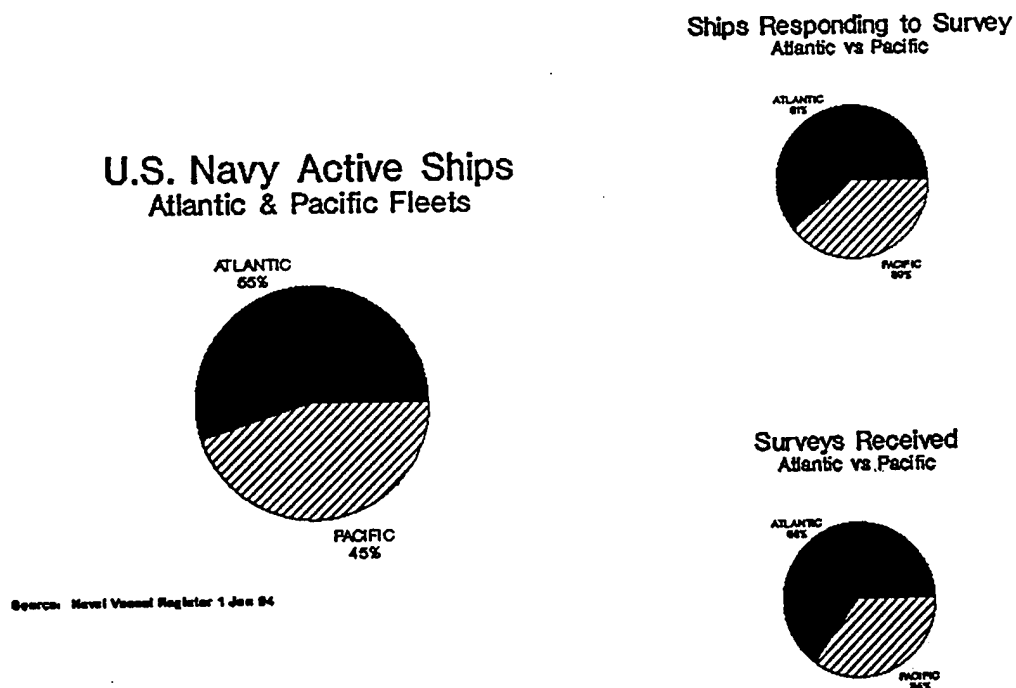


Figure 2. Ship and Survey Distribution Between Fleets

**Table 1: Type of Ship that Responded to Survey**

	<b>No. of Ships Responding N = 125</b>	<b>No. of Surveys N =517</b>
<b>SUBMARINES</b>	32	86
<b>AIRCRAFT CARRIERS</b>	10	74
<b>SURFACE COMBATANTS</b>	41	177
<b>PATROL SHIPS</b>	1	1
<b>AMPHIBIOUS WARFARE</b>	22	87
<b>MINE WARFARE</b>	1	5
<b>AUXILIARY</b>	18	87

Approximately 34% of the surveys were from surface combatants, 17% each from submarines, amphibious warfare ships and auxiliary ships, 14% from aircraft carriers, 1% from mine warfare ships and less than 1% from patrol ships. These numbers are, for the most part, compatible with the actual numbers of each type of ship in the fleet (surface combatants: 33%; submarines: 29%, amphibious: 15%; auxiliary: 18%; carriers: 4%; mine warfare & patrol: <1% each). Two discrepancies exist. Carriers which make up 4% of the ship population, but 14% of the surveys, and submarines, which make up 29% of the ship population but only 17% of the surveys. In both cases the discrepancies are alleviated when one considers the population of these ships. The average surface ship has a crew complement of 250-550, while a carrier population (without air crew) is around 3000 and a submarine only about 135. Actual ship complements are dependent on class. Thus the higher representation of carrier personnel is offset by their having a larger population. Conversely, the lower representation of the submarine community is offset by their having a smaller population. Figure 3 provides a visual representation of the number of ships by type in the fleet and those responding to the survey.

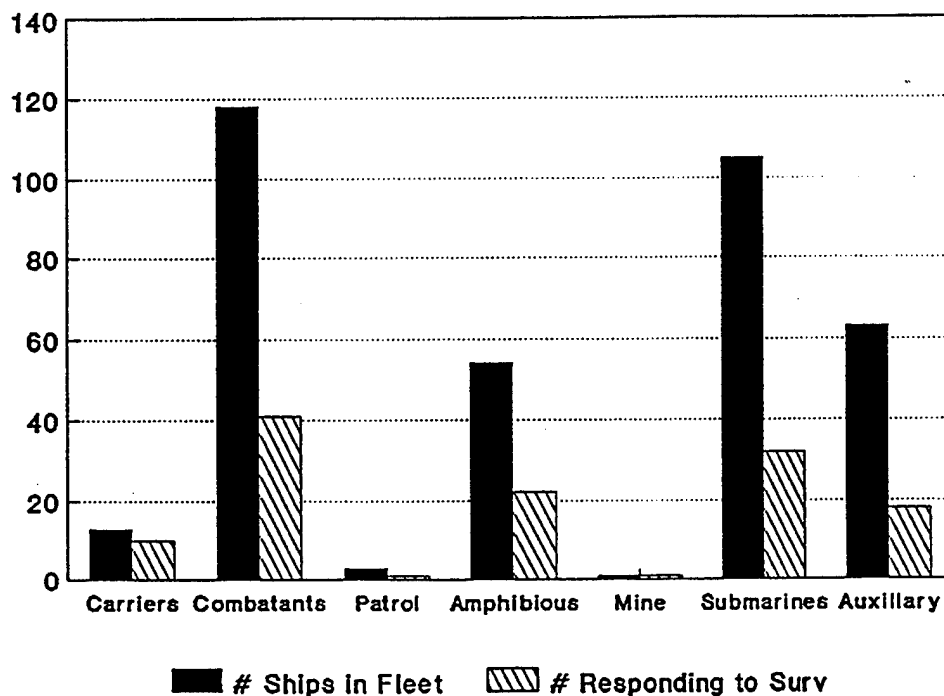


Figure 3. Number of Ships By Type

#### Grade:

Response rates for Officers, 52.4%, and Enlisted crew, 47.6, were fairly equal.

#### Department:

The responses received were evenly distributed between the Engineering department (48.5%) and the Supply department (51.5%). Specific job titles of the respondents are on file at NRDEC.

#### Years of Service (Crew Members):

The mean number of years in the service for all respondents was 12.75 years.

#### Number of Years Assigned/Attached to Ship:

The mean number of years a respondent was attached to a ship was 4.0 years. The data, however, is skewed by a small percentage of individuals who had been assigned to the ship for greater than 4 years. Therefore, a better average, in this instance, would be the median of 2 years. Table 2 shows the number of years a respondent had been assigned to a particular ship.

**Table 2: Number of Years Assigned to Ship**

<b>Number of Years</b>	<b>Number of Responses (N=491)</b>
1 to 2	68.8%
3 to 4	12.0%
Greater than 4	14.7%
Missing Responses	4.5%

**Working Relationships**

**Question 11**

**"How would you describe the working relationship between Food Service and Engineering?"**

**Table 3: Working Relationship Between Food Service and Engineering**

	<b>N=506</b>
Good	37.4%
Satisfactory	36.4%
Needs Improvement	26.2%

Table 3 shows that just over 25% of respondents thought that the relationship between Food Service and Engineering needs improvement. Table 4 lists some of the most frequent responses provided when respondents were asked to explain why they felt their working relationship was good, satisfactory or needing improvement.

**Table 4: Reasons for Working Relationships**

	N= 517
Good relationship/people	7.3%
Good Support - Timely/ Effective Repair team	8.9%
Good Communication, Regular Meetings/ Walk through	4.3%
Need improved communication/relationship / support	14.8%
FS too low priority / response time too slow	7.5%
Need Training / Outside support	0.6%
Need Established Galley Team	0.6%
Material Deficiencies	0.2%
Other Responses	7.3%
No Response	48.5%

Responses to Question 11 differ significantly according to command. The working relationship between Food Service and Engineering was considered to need improvement by 31% of surface ships, 25% of carrier personnel and 8% of the submarine community. The responses from the submarine respondents suggest that there is a better relationship between the two departments on board submarines.

A significant difference in responses to this question was also found between the officers and enlisted crew members. Twenty-two point five percent of officers said that the relationship needs improvement, whereas 31.0% of enlisted crew members said the relationship needs improvement. This finding may suggest that those officers in charge of departments may see the working relationship as better than those who actually carry out the day to day operations.

Another significant difference was found in the reasons given for the negative responses to Question 11 between the Supply and Engineering Departments. Primarily, the Engineering

Department attributed the need for an improved relationship to poor communication and support - whereas, Food Service stated that their department "had too low a priority" and that the "response time for maintenance" was too slow.

### **Conclusion to Question 11**

The relationship between Food Service and Engineering Departments appear to vary from ship to ship. The greatest need for improvement came from the surface ships and the enlisted respondents. The reasons why a relationship was deemed "good" "satisfactory" or "needing improvement" appears to be dependent on the respondent's department. Supply personnel cited their feeling that food service is given too low a priority as a major factor, while the Engineering Department suggested that there needs to be improved communication.

### **Question 12**

**"Do you feel there is adequate command level interest in food service."**

As shown in Table 5, the data indicate that respondents state there is adequate command level interest in food service. The responses are highest when respondents were asked about there own ship with over 78% of responses stating that there was adequate command level interest in food service. When asked about "Navy Wide", this figure fell to 55.5%. The data suggest that command level interest is perceived as being lower, the more removed from an individual ship it is.

**Table 5: Command Level Interest in Food Service**

	<b>YES (%)</b>	<b>NO (%)</b>	<b>DON'T KNOW (%)</b>
Navy Wide	55.5	25.0	19.5
Aboard This Ship	78.5	19.4	2.2
In Home Port	67.7	22.6	9.7
Deployed	70.7	14.5	14.8

Table 5 also indicates that once a ship is deployed there is increased command level interest. This seems fairly intuitive as there are other food service options open to crew members in port, but no others once the ship is deployed.

A significant difference was found between the responses given by individuals from the different ship types for the "In Home Port" section of the question. Eighty point six percent of carrier respondents said there is adequate command level interest in food service in their home port, compared to 66.4% for surface ships and 62.7% for submarines. This result may be indicative of the size and logistics involved in the carrier's Food Service Department as compared to other ships.

A significant difference exists between the Officer and Enlisted responses for all categories, except "Navy Wide". There are consistently more responses from officers citing that there is adequate command level interest in food service than from the enlisted respondents: 84.0%, 72.7%, 73.8% compared to 72.6%, 62.7% and 68.4% respectively for the categories, "Aboard this ship", "In home port", and "Deployed". Officers consistently have fewer responses of, "No, there is not adequate command level interest in food service", than the enlisted's responses.

A similar pattern exists between Supply and Engineering. Where Supply consistently, across all four categories, feels there is a lower level of command level interest in food service. This may be a result of there being more officers in Engineering than Supply responding to this survey. (see Table 6).

**Table 6: Grade By Department**

	Enlisted	Officer
Supply	54.8%	45.2%
Engineering	39.5%	60.5%

### **Conclusions to Question 12**

Command level interest is generally higher aboard a respondent's own ship than it is Navy wide. Command level interest falls when a ship is in home port. Officers feel there is more command level interest than enlisted crew members. Of the two departments, Engineering indicated there is more adequate command level interest in food service, this may be due to the larger number of Engineering officers responding to this survey.

## Management of Food Service Equipment

### Question 13

**"Does the ship have individuals from the Engineering Department specifically assigned to galley maintenance and repair?"**

**Table 7: Galley Maintenance Teams, Overall Response**

	N=509
Yes	51.1%
No	48.9%

As shown in Table 7, approximately 50% of ships have individuals from the Engineering Department assigned to galley maintenance and repair. However, significant differences were found between the Atlantic and Pacific fleets, the type of ship, and between Supply and Engineering. (See Table 8).

**Table 8: Galley Maintenance Teams, Responses by Fleet, Ship Type and Department**

	Atlantic	Pacific	Carrier	Surface	Sub	Supply	Eng
Yes	44.1%	58.2%	65.2%	48.2%	39.5%	41.9%	56.1%
No	55.9%	41.8%	34.8%	51.8%	60.5%	58.1%	43.9%

Table 8 shows that the Pacific fleet ships report that an individual from Engineering is assigned to galley maintenance nearly 60% of the time as compared to only 44% for the Atlantic fleet. This difference may be attributed to logistical constraints on each fleet and/or different management approaches.

Table 8 also indicates that carriers have engineers assigned to galley maintenance more often when compared to both surface ships and submarines. This is most likely due to the larger complement of the carriers.

The difference between Supply and Engineering (Table 8) suggests that Supply does not always know when an engineer is assigned specifically to the galley.

#### **Question 14**

**"Do these individuals report to Supply or Engineering?"** Most respondents (94%) stated that the engineers report to Engineering, while 6% stated that they report to Supply.

Looking at all groups collectively, 94% of respondents believed that engineers reported to Engineering. Interestingly, 9% of Supply thought the engineers reported to them; while only 1.9% of engineers said they reported to Supply. This difference in perception might be due to a lack of communication.

Also, 12.5% of respondents from submarines stated that engineers assigned to galley maintenance reported to Supply while only 2.1 % from carriers and 4.8% from surface stated they had engineers reporting to Supply.

### **Maintenance**

#### **Question 15**

**"How effective is the 3M system for accomplishing and collecting maintenance data for food service equipment?"**

**Table 9: Effectiveness of 3M System**

	N=493
Not Effective	25.8%
Effective	65.9%
Very Effective	8.3%

Over 74% of respondents stated that the 3M system (Ship's Maintenance and Material Management System) is effective or very effective (Table 9). However, a significant difference exists between Supply and Engineering responses. Sixty-nine percent of the Supply responses stated that the 3M system was effective or very effective compared to 79% of the responses from

Engineering. Thus, the Engineering Department typically sees the 3M system as being more effective.

The prevalent reasons for the perceived ineffectiveness of the 3M System were: equipment is not COSAL supported, documentation is not accurate and/or up-to-date, only minimum maintenance is performed, the system is not monitored, the system is not used, is too time consuming, poor communication and personnel not trained to use the system.

#### **Question 16**

**"Are spot checks conducted for preventative maintenance for food service equipment?"**

Overall, 87.0% of respondents stated that spot checks were conducted, while 13% stated they were not. There was a difference in the response patterns for Supply and Engineering: 96.2% of Engineering respondents stated that spot checks were conducted, compared to 76.3% of the Supply Department responses. This difference may be attributed to a lack of communication between the two departments.

Question 16 further asked, **"Who conducts them?"**

**Table 10: Department Conducting Preventative Maintenance Spot Checks**

	N= 435
Food Service	7.4%
Engineering	51.7%
Both	40.9%

Engineering, either independently or with Food Service, conducts most of the spot checks. There is again a significant difference in the responses to this part of Question 16. Table 11, indicates that responses from the Supply Department show that their department carries out 63.2% of spot checks, whereas Engineering indicated that Supply is involved in only 35.8% of all spot checks.

**Table 11: Spot Checks, Response by Department**

	Supply	Engineering
Food Service	13.4%	2.2%
Engineering	36.8%	64.2%
Both	49.8%	33.6%

There also exists a similar pattern of responses between the officers and enlisted crewmembers. Officers responded in a similar way to Engineering, and the enlisted crew responded in a similar way to Supply. This may be indicative of the distribution of officers and enlisted crew members between the departments (see Table 6).

### **Repair**

#### **Question 17**

**"Is there currently a structured program/practice for managing the repair of food service equipment?"** Fifty-nine percent of respondents indicated that there was a structured program, while 41% indicated that there was no structured program. Question 17 further asked, **"How effective is it?"**. The responses of those who replied YES to the first part of this question are presented in Table 12.

**Table 12: Effectiveness of Food Service Equipment Repair Program**

	N = 287
Not Effective	2.8%
Slightly Effective	14.6%
Moderately Effective	59.6%
Very Effective	23.0%

**Question 18 (Open Ended)**

**"Briefly explain how the program for managing repair operates and why it is effective or ineffective."** Responses to this question were lengthy and varied greatly, therefore they have been filed at NRDEC and have not been included in this report. In general, responses focused on the use of trouble logs, 8 O'Clock Reports and regular meetings as methods for managing repairs. Although comments on effectiveness varied, the following areas were repeatedly mentioned as requiring attention: communication between the Supply and Engineering Departments, training, timely parts support, manpower allocations, priority of food service repairs and accountability. Respondents often acknowledged that management tools are in place and can be effective if used properly.

**Question 19**

**"What percentage of food service equipment repairs are: mechanical, electrical or AC & refrigeration related?"** The results, shown in Table 13, indicate that there is a fairly even spread of repair problems across these three categories.

**Table 13: Mean Percentage of Food Service Repairs by Division**

	%
Mechanical	32.0%
Electrical	39.9%
AC & Refrigeration	31.2%

**Question 20**

**"Who prioritizes food service equipment repair needs?"** Approximately 47% of the respondents stated that Supply is responsible for prioritization, while 30% indicated that Engineering was responsible. The remaining 23% felt both departments were responsible for food service equipment repairs.

**Question 21**

**"Are there readily available technical manuals for food service equipment repair?"** Eighty-four percent of responses stated there were technical manuals, compared to 16.0% who stated that there were none. Of those who responded YES previously, 87% indicated the manuals were up to date.

Responses to the second part of the question were significantly different depending on the type of ship and department responding. Ninety-five point six percent of respondents from submarines stated that their manuals were up to date as compared to 89.1% for carriers and 84.3% for surface ships. Ninety-three point four percent of Supply respondents stated that the manuals were up to date as opposed to 79.8% for Engineering.

**Question 22**

**"Who has copies of these manuals?"**

**Table 14: Location of Technical Manuals**

Engineering	35%
Food Service	5%
Tech. Library	7%
Engineering and FS	27%
Engineering and Tech Lib.	11%
FS and Tech Lib.	1%
All Three	10%
Other	4%

**Question 23**

**"How useful are these manuals?"** The responses are shown in Table 15. Over 98% of respondents found the manuals to be "somewhat to very useful".

**Table 15: Usefulness of Technical Manuals**

	N=474
Not at all useful	1.1%
Somewhat Useful	55.1%
Very Useful	43.8%

### Conclusions from Questions 21 to 23

Over 98% of the respondents with manuals find them to be useful. It would therefore seem important to ensure that those who do not have manuals, or who have out-of-date manuals, be supplied with current manuals. Question 22 indicates the importance of determining what versions of the manuals exist, and who is responsible for updating them. Since the majority of respondents felt that these manuals were "somewhat" rather than "very" useful there may be an opportunity for improvement in this area.

### Question 24

**"In the event of equipment failures, how often do you research if equipment is under warranty before you initiate the repair?"** As shown in Table 16 over 50% of respondents, never or almost never check for warranty information.

**Table 16: Frequency of Warranty Checking**

	N=483
Never	20.1%
Almost Never	31.1%
Sometimes	22.6%
Often	14.9%
Always	11.4%

### Question 25

**"Who is responsible for documenting equipment deficiencies?"** From Table 17, it can be seen that this is a shared responsibility of Engineering and Supply, as indicated by over 70% of the respondents. The responses from the Supply and Engineering Departments differ significantly when only one department was indicated as being responsible for equipment deficiency documenting. Eighteen point six of the Supply Department's responses stated Supply alone was responsible, and 8.1% that Engineering alone was responsible. In contrast, only 9.4% of the engineers responses stated that Supply alone was responsible, while 20.8% stated that Engineering alone was responsible. Thus, it would seem that each department saw itself as having more individual responsibility than the other department for documenting equipment deficiencies.

**Table 17: Responsibility for Documenting Food Service Equipment Deficiencies**

	N=507
Supply	14.1%
Engineering	14.2%
Both	71.7%

**Question 26**

**"Is the use of Eight O'Clock Reports effective or ineffective?"** Eighty-five point nine percent of respondents stated they were effective, while 14.1% stated they were ineffective. Interestingly, no significant difference was noted between the responses of Supply and Engineering.

**Question 27**

**"How often are repair parts readily available aboard this ship?"** Table 18 lists the overall responses. Since 73% of respondents stated parts are available from sometimes to never, there appears to be considerable room for improvement in the management of repair parts.

**Table 18: Availability of Parts**

	N=499
Never	0.8%
Almost Never	20.6%
Sometimes	52.1%
Often	25.7%
Always	0.8%

A difference in responses was found between Supply and Engineering and between ship types. Supply's responses to Question 27 indicate that parts are more often available than not available (median response "sometimes", with the mean closer to "often"). However, Engineering's responses indicated that parts are not as likely to be available (median response "sometimes",

with the mean closer to "almost never"). Since Engineering is mostly involved in the repair and maintenance process (see questions 13, 14, 16, 22) communication needs to be improved between these departments to facilitate part availability (see question 11, parts one and two).

The responses for each of the three groups of ships are listed in Table 19. The submarines and the carriers have better parts availability than do the surface ships. Parts availability on board the submarines is the best of the three with over 39% of the respondents stating that parts are often available. These differences are probably an indication of the operational characteristics of each group.

**Table 19: Part Availability Differences Between Ship Type**

	Carriers	Surface Ships	Submarines
Never	0.0%	0.6%	2.4%
Almost Never	10.6%	24.4%	13.3%
Sometimes	62.1%	53.0%	41.0%
Often	27.3%	21.8%	39.8%
Always	0.0%	0.3%	3.6%

#### **Question 28 (Open Ended)**

**"If repair parts are not readily available, please explain what you have to do to order them?"** The responses varied widely and depended on the interpretation of the question. Some responses indicated who orders the parts while others indicated how the parts are ordered. Supply appears to have the majority of the responsibility for ordering parts although Engineering must initiate the order. Responses indicated the need to research the part's stock number and availability. If the part is not available through the stock system an open purchase request is initiated. Some respondents indicated that they contact the equipment manufacturer directly when ordering parts.

#### **Question 29**

**"What percentage of food service equipment on your ship is COSAL supported?"** Table 20 shows that more than 75% of respondents have 50% or more of their equipment COSAL supported.

**Table 20: Percentage of COSAL-Supported Food Service Equipment**

	N=472
Less than 25%	5.1%
25 - 30%	16.9%
50 - 75%	34.3%
75 - 100%	43.6%

The Supply and Engineering Departments differ slightly in their responses. Supply indicated a higher level of COSAL-supported food service equipment than Engineering (82.1% of responses stating above 50% of equipment is COSAL supported compared to 73.6% for Engineering).

**Question 30**

**"When you order spare parts, how responsive is the system to your request?"**

**Table 21: Responsiveness of Procurement System**

	Not at All	Somewhat	Moderately	Very
Navy Wide	8.1%	39.1%	46.8%	5.9%
Aboard this Ship	3.5%	21.7%	41.5%	33.1%
In Home Port	5.3%	27.9%	46.1%	20.7%
Deployed	12.1%	37.4%	34.1%	16.4%

These responses seem to follow the same pattern as in Question 12. There is a perception that the system is least responsive "Navy Wide", but is moderately to very responsive on board a respondents own ship. Again, the system seems to more responsive in home port than when deployed. This finding is as expected since parts take longer to reach deployed ships.

Responses from personnel on board submarine indicated a much higher responsiveness of the system: aboard this ship, when deployed and when in home port. Again, this may be due to the

nature of submarine operations.

A significant difference was found between responses from the Atlantic and Pacific fleets. The Atlantic fleet's responses tended toward the "somewhat responsive" response, while the Pacific fleet's responses tended toward the "moderately responsive" response. This difference may in part be explained by Question 13, which indicates that the Pacific fleet has more engineers specifically assigned to galley maintenance which may facilitate the part ordering process.

#### Question 31

**"When the food service equipment repair is beyond the capabilities of the ship's force, what option(s) do you generally use to get it repaired? (Circle all that apply) ."** Table 22 lists the responses.

Table 22 shows that the Ship Intermediate Maintenance Activity (SIMA) option is in general the most favored. However, carrier responses only opted for the SIMA option 28.8% of the time whereas, "Assist Visits" were favored by 54.5% of the carrier respondents. A further significant difference emerged for the responses of those with 1-3 years of experience and those with more. Those with 1-3 years experience chose the SIMA option more frequently (55.4%) than those with more experience (37.4%).

Engineering and Supply differed in the number of responses for the "Call Manufacturer" option. Engineering indicated that they were more apt to contact the manufacturer (50.8%) than Supply (40.9%) This is to be expected since they are directly responsible for equipment repair.

**Table 22: Options for Repair of Food Service Equipment**

	N=500
We just replace it	48.2%
SIMA	51.3%
Waterfront Contract	37.7%
Call Manufacturer	45.6%
Assist Visits	38.0%
Other	13.9%

#### Question 32 (Open Ended)

**"If the system is not adequately responsive, where do you think the breakdown happens?"** The following is a summary of the most common responses listed in descending

order by frequency of response: lack of parts on hand, lack of priority/funds, administrative, Supply, lack of COSAL supported equipment, Engineering, and ashore procurement.

#### **Question 33 (Open Ended)**

**"How does deployment affect this process?"** Many of the respondents cited that obtaining parts is more difficult when deployed. Responses indicated that unless the parts were already in stock on board the ship, they were difficult, if not impossible, to obtain. Respondents did indicate that there is extra attention given, prior to deployment, to get equipment in good working order. Also, it was noted that problems are given a higher priority when deployed, particularly in the case of essential equipment. Comments indicated that the crew is quite resourceful when preparing and responding to equipment failures. Many crews stock extra parts for deployments and some indicated that, on occasion, they make the part if its not in stock.

#### **Question 34 (Open Ended)**

**"In your opinion, what are the top three management problems related to food service equipment and repair?"** Together there were approximately 900 responses to this question. Grouping similar responses together, five key areas were identified. "Parts / COSAL" support was identified by the most number of respondents as being a problem for managing equipment repairs. Approximately 250 of the 900 responses (28%) were "Parts / COSAL" related. The second largest response was in the area of training, with approximately 160 responses (18%). The next areas of concern were: the low priority of food service operations, food service equipment being nonstandardized/inferior and personnel issues such as lack of communication and poor morale/attitudes. Each of these areas accounted for approximately 8% of the total response. A complete listing of the responses is on file at NRDEC.

### **Replacement**

#### **Question 35**

**"Is there currently a structured program / practice for managing the replacement of food service equipment?"** Twenty-nine point three percent responded that there was a structured program as opposed to 36.9% who responded that there was not. The remainder responded that they did not know whether there was a program or not.

Carrier responses were significantly different from the surface ships and submarines, with over 65% stating that there was a structured program as compared to 23.1% and 25.3%, respectively.

There was also a significant difference between departmental responses: 38.1% of Supply's respondents stated there was a structured program compared to 19.7% of the Engineers. This, too, may be an indication of a lack of communication between departments.

Question 35 further asked, **"How effective is it?"** Table 23 displays the responses. Over 93% of respondents who have a structured program for managing the replacement of food service equipment find it at least "Adequately Effective".

**Table 23: Adequateness of Structured Program for Food Service Equipment**

	<b>N=517</b>
Not Effective	6.2%
Adequately Effective	59.3%
Very Effective	34.5%

Question 35 adds, **"Briefly explain how equipment is ordered."** As with Question 28, the responses to this question varied widely depending on the individuals interpretation of the question itself. The responses indicated that the responsibility for ordering new galley equipment lies chiefly with the Supply Department and EQOL Teams. In some cases purchases are made by the type command. As with replacement parts, equipment is sometimes ordered by means of an open purchase. Phased replacement programs were noted as being used (or needed) in a number of cases.

#### **Question 36 (Open Ended)**

**"What are some of the more effective practices you have worked with?"** The responses show that the most frequently mentioned practice is the phased/planned replacement of equipment. This was followed by the need for good/regular communication between Supply and Engineering, the use of Galley Maintenance Teams, assigning engineers to the Supply Department and the support received from EQOL and other assist teams. A number of other suggestions were made and are on file at NRDEC.

#### **Question 37**

**"Are there any standard regulations/guidelines to follow when replacing food service equipment?"** Table 24 shows that 47.1% of respondents stated that there are standard regulations to follow while 41.3% indicated they did not know. Table 24 also shows that of those indicating there are standard regulations, only 54.9% felt the regulations were adequate and 39.7% felt they needed to be updated.

**Table 24: Replacement Regulations for Food Service Equipment**

	<b>N= 465 Are there Regulations?</b>	<b>N= 306 Are they Adequate?</b>	<b>N= 317 Need to be Updated?</b>
<b>YES</b>	47.1%	54.9%	39.7%
<b>NO</b>	11.6%	14.1%	22.7%
<b>DON'T KNOW</b>	41.3%	31.0%	37.6%

Sixty-three point two percent of Supply's respondents stated that there were regulations, compared to only 30% of Engineering's. This is likely due to fact that it is Supply's (Food Service Division) responsibility to replace their equipment. Additionally, 63% of the Supply Department's responses stated that these regulations were adequate, while 17% felt they were not adequate and 20% did not know one way or another.

**Question 38**

**"How is the replacement of equipment scheduled?"** Table 25 clearly illustrates that equipment is generally replaced on an "as needed" basis.

**Table 25: Scheduling of Food Service Equipment Replacement**

	<b>N=443</b>
<b>In Advance</b>	12.4%
<b>As Needed</b>	69.5%
<b>Other</b>	18.1%

Of the respondents indicating "other", approximately half stated that equipment replacement is scheduled both in advance and as needed.

Supply responses indicated that they order equipment in advance more frequently than Engineering, 18.1% vs 6% respectively. Also, individuals with more experience stated more often that they order equipment in advance (17.3%) compared with those with less experience (11.2%).

**Question 39**

**"Do you have a copy of the shipboard food service equipment catalog on board?"**  
Overall, 80% of respondents stated that they have a copy of the shipboard food service catalog on

board, while 20% stated they did not. There was a significant difference between the responses of Supply and Engineering. Table 26 shows that the Supply department has copies of the food service equipment catalog more often than the Engineering department. This is as expected since Supply (Food Service Division) is responsible for ordering the galley equipment. However, since Engineering is responsible for the equipment's upkeep it would be beneficial for them to have a copy of the catalog and to assist in the ordering of equipment. By working together, the two departments can insure that the equipment meets the needs of the operator and is also suitable from a maintenance perspective.

**Table 26: Availability of Food Service Equipment Catalog**

	Supply	Engineering
YES	91.9%	62.2%
NO	8.1%	36.6%

**Question 40**

**"Who prioritizes food service equipment replacement needs?"** Table 27 shows that the Supply department most often prioritizes food service equipment replacement needs.

**Table 27: Prioritization of Food Service Equipment Needs**

	N=438
Supply / Food Service	76%
Engineering	3%
Both	11%
Other	10%

**Question 41**

**"Before equipment is replaced is there an attempt to repair it?"** Nearly all (99%) respondents said that they attempt to repair equipment before they replace it.

The question further asks, **"If yes, how successful are these attempts?"** Table 28 lists the responses for both in home port and deployed. The table shows that repairs are more successful in home port than when deployed, with over 60% of repairs being almost always

successful in home port compared to less than 40% when deployed. This difference is most likely due to the availability of spare parts. (See Questions 27 through 30.)

**Table 28: Success of Food Service Equipment Repairs**

	<b>Rarely</b>	<b>Somewhat</b>	<b>Almost Always</b>	<b>Always</b>
<b>In Home Port</b>	3.8%	34.4%	54.1%	7.8%
<b>Deployed</b>	11.4%	49%	36.8%	2.7%

There were significant differences in the departmental responses. Engineering reported a greater success rate than Supply. This finding is fairly intuitive, since it is a function of the Engineering Department to repair equipment.

#### **Question 42**

**"Are manufacturers' technical assistance programs available?"** Nearly 64% of respondents stated that technical assist programs are available. The Pacific and Atlantic fleets differ in their responses to this question. More Atlantic fleet respondents stated that technical assistance programs are available (68.7%) as opposed to the Pacific fleet respondents (54.6%).

Question 42 further asked, **"Do you use them?"** Seventy-three percent of those who responded yes to the first part of this question indicated that they used the technical assist programs available to them, while 27% responded they did not. This indicates only 46.5% of respondents use or have available to them technical assistance programs.

#### **Question 43**

**"In your opinion, what are the top three management problems related to food service equipment replacement?"** The responses to this open-ended question are on file at NRDEC. Due to their length, they have not been included in this report. Overall, there were approximately 640 responses to this question. After combining the answers to Question 43 and grouping similar responses together, there were four main areas of concern. Approximately 100 responses (15.6%) cited **financial constraints** as a major problem to replacing food service equipment. A similar number noted that the **availability of equipment and parts** is a concern. Slightly less (93 responses, 14.5%) indicated that they experienced problems with **equipment replacements** - factors included: lack of standardization, poor quality, non-compatibility and installation problems. Another 90 responses (14.1%) cited problems with the **ordering process**, specifically noting excessive lead times, improper substitutions, backlogs etc.. Additional areas of concern were: having the proper information to place an order (41 responses, 6.4%), poor communication (33 responses, 5.1%), lack of planned / phased replacement program (33 responses, 5.1%), training (25 responses, 3.9%), lack of priority (21 responses, 3.3%).

**Question 44**

**"Please use the scale to rate your views on changes that may improve food service operations."** The items in Table 29 are rated on a 3 point scale, where: 1 = not important, 2 = important and 3 = very important. All items except for item c, "more equipment", are rated as being important to extremely important. Item c, "more equipment", is rated somewhere between not important and important, being closer to important than not important.

**Table 29: Changes Which May Improve Food Service Operations**

	Scale Not Important   Important   Extr. Important .....1.....2.....3.....
a. Warranty information and usage	.....2.25
b. Better quality equipment	.....2.70
c. More Equipment	.....1.80
d. Better Parts support	.....2.80
e. Improved acquisition support	.....2.56
f. Self - Diagnostic equipment	.....2.19
g. Greater emphasis on preventative maintenance	.....2.32
h. More recognition for a job well done	.....2.20
i. Training and FS personnel in equipment operation and cleaning	.....2.75
j. Training for Engineering department personnel in food service equipment repair	.....2.71
k. More expert help with equipment	.....2.40
l. Standardized equipment (same for each class of ship).	.....2.53
m. Dedicated repair personnel for food service	.....2.30

One noteworthy difference existed between Supply and Engineering in regard to dedicated repair personnel for food service. Supply gave a mean response of 2.69, tending towards "extremely important"; compared to Engineering's mean rating of 1.93, tending toward "important".

#### Question 45

"If you feel more expert help is needed, please indicate what type of help you would like to have. (Circle all that apply)" Table 30 shows the leading choice was "on site support from the equipment manufacturer" having been selected by over 73% of the respondents.

**Table 30: Type of Expert Help Needed**

a. Information Hotline	47.8%
b. More Assist Visits	29.1%
c. Shipboard Training Sessions	55.9%
d. Ashore Training Sessions	30.7%
e. On site support from equipment manufacturer (i.e. service reps)	73.7%
f. Waterfront contracts	41.0%
g. Video Training	33.2%

A significant difference was found in the responses between the three groups of ships. Only 39.7% of submarine responses favored Shipboard Training Session, whereas 60.3% and 63.7% of carriers and surface ships, respectively, favored it.

#### Question 46

"Please list any pieces of food service equipment that gives you consistent trouble in your job, are permanently out of service, or are rarely used..." There responses to this question varied greatly and are on file at NRDEC.

#### Question 47

"On average, what percentage of food service equipment is up and running?" Table 31 lists the responses to this question for the four given categories.

**Table 31: Percentage of Up and Running Equipment**

Less than 25%	0.4%
25 - 50%	3.2%
50 - 75%	18.7%
75 - 100%	77.7%

It can be concluded that food service equipment is up and running most of the time.

**Question 48**

**"What new equipment would you like added to your mess?"** The answers to this open ended question varied greatly and have been placed on file at NRDEC.

**Training**

**Question 49**

**"Do you feel there is adequate training available in food service equipment maintenance and repair?"** Nearly 26% responded that there was adequate training, while 74.6% responded that there was not adequate training. Submarine responses were significantly different than those from other ships with 40.5% indicating that there was adequate training, compared to 29.3% and 20.9% from the carriers and surface ships, respectively.

Question 49 continued, **"What type of training is provided: In home port and when deployed?"** The specific responses to this question are on file at NRDEC. Of the 305 open-ended responses, the majority of the results can be grouped into three categories - assist visits, no training and on-the-job training. Assist visits accounted for 64 (21%) of the responses. These assist visits included training provided by the Navy Food Management Teams, EQOL teams and other support groups. No training was the response in 58 instances (19%) and "on-the job training" was listed 52 times (17%). The remaining 43% of responses contained a mixture of who received the training (i.e. Engineers, MS's etc), where the training was provided (shipboard, ashore), type of training (hands on, lecture, videos, manuals), and some miscellaneous comments.

While deployed, 36% of respondents indicated there was "no training" and 23% indicated they received "on-the-job training". The remaining responses were a mixture of who received the training (i.e. Engineers, MS's etc), who provided the training (divisions, assist teams) and the type of training (hands on, lecture, videos, manuals).

#### Question 50

**"What additional type of training would you like to have?"** The responses to this open-ended question varied. Some of the topics included specific pieces of equipment, location (on-board, ashore), type (formal school, hands-on), and people to be trained (food service, engineering). There were requests for training in operation, maintenance, troubleshooting, and repairs. A complete listing of answers to this question can be found in Appendix B.

#### Question 51

**"What priority is training in food service equipment given?"** Table 32 lists the responses. While the mean response is between "moderately low priority" and "medium priority", 38.8% stated that training either doesn't exist or is rated a very low priority while only 13.4% rated food service training to be in the moderately high to very high priority range.

**Table 32: Priority of Training in Food Service**

	N=479
a. There is no training at all	11.7%
b. Very low priority	27.1%
c. Moderately low priority	17.7%
d. Medium priority	30.1%
e. Moderately high priority	10.1%
f. Very high priority	3.3%

#### Question 52

**"Do you feel food service equipment impacts on the quality of the food?"** Nearly all respondents (94.9%) stated that food service equipment impacts on the quality of food.

#### Question 53

**"What is the most common limiting factor for the repair of food service equipment? (prioritize top three)."** A rank score was calculated according to the percentage of responses received by a category. Both the rank score and percentage number of responses are listed in Table 33. Responses in the "other" category included manpower limitations, the low priority of food service, and Food Service not reporting the problem in a timely manner. This table demonstrates that the primary limiting factor for repairing food service equipment is obtaining parts.

**Table 33: Top Three Factors for the Repair of Food Service Equipment**

	<b>Rank</b>	<b>% of Responses</b>
a. Identifying the problem	3	17%
b. Getting Engineering to respond to the trouble call	6	9%
c. Getting the right person from Engineering to respond	5	11%
d. Identification of required parts	2	20%
e. Obtaining parts	1	27%
f. Budget	4	12%
g. Other	7	4%

**Question 54**

**"What is the most common cause of food service equipment failures? (Prioritize top three)."** The rank ordering of response options was done in the same way as Question 53. Causes listed as "other" included: normal wear and tear, poor quality equipment, equipment age, and lack of training. The ranks and percentage responses are presented in Table 34. Excessive use is the top problem. This is an inherent problem in Navy food service operations when equipment is operated around the clock to keep up with the demand of four daily meals. Lack of parts support and improper operation were the second and third reasons cited for equipment failures. Improper operation is most likely a training issue since lack of training was repeatedly noted throughout the survey.

**Table 34: Top Three Causes of Food Service Equipment Failure**

	<b>Rank</b>	<b>% of Responses</b>
a. Improper Operation	3	14%
b. Improper Cleaning	6	10%
c. Improper preventative maintenance	7	8%
d. Lack of preventative maintenance	5	11%
e. Excessive Use	1	24%
f. Not properly adapted to shipboard use	4	12%
g. Lack of parts support	2	19%
h. Other	8	2%

**Question 55**

**"Is accessibility for cleaning, maintaining and/or repairing of food service equipment a problem?"** Table 35 lists the responses. Almost 80% of the participants indicated accessibility is "sometimes a problem" to "never a problem". Further studies would be needed in order to determine the total impact of accessibility on food service equipment management.

**Table 35: Accessibility of Food Service Equipment**

	<b>N=487</b>
Usually a problem	6.6%
Often a problem	15.8%
Sometimes a problem	47.6%
Rarely a problem	27.3%
Never a problem	2.7%

#### Question 56

"Do you feel the management of food service equipment on this ship is typically: Proactive or Reactive?" Table 36 indicates that management of food service equipment is perceived as being neutral to somewhat reactive.

**Table 36: Management of Food Service Equipment**

	N=490
Very Proactive	1%
Somewhat Proactive	23.1%
Neutral	32.2%
Somewhat Reactive	26.7%
Very Reactive	10.8%

#### General Conclusions

The management of food service equipment includes the operation, preventive maintenance, repair, support materials (parts, tools and technical manuals/documentation), scheduling/ordering replacements, training, interdepartmental relationships and the accountability of all individuals involved. Together the Supply and Engineering Departments play vital roles in the upkeep of this equipment. The success of the procedures presently in place depend on the team work and cooperation of these two departments.

In over 21 questions, the responses from the Supply Department differ significantly with those of Engineering. In many cases, the difference is due to a lack of knowledge in an area outside the scope of the individual's job. Another possibility is a lack of communication between the two departments. In addition to the statistical differences, NRDEC's initial review of the surveys found that comments often varied widely from very positive to very negative. Consequently, an initial problem in the chain of food service equipment repair is a lack of communication between the Supply and Engineering departments. One solution to this problem is to cross train members of each department. Not only would this increase the skill level of personnel, but it would also facilitate communication between the departments. Questions 49 to 51 also deal with training. The responses to these questions demonstrate that those who maintain and operate food service equipment feel that, in most cases, training is not adequate.

Parts support is a another area of concern that needs to be examined more closely. The

survey demonstrates that the availability of parts (questions 27 to 30) is not adequate. An improvement can be made in the maintenance of food service equipment by increasing parts availability.

In conclusion, results of the survey indicate three key areas of concern:

- **Communication between departments**
- **Training**
- **Availability of repair parts**

## **DEVELOPMENT OF ALTERNATIVES**

### **Methodology**

Based on the survey results, two shipboard food service equipment management alternatives were developed - a fleetwide concept and a modular concept. The fleetwide concept, designated the "Food Service Equipment Technical Assistance Program", addresses a wide range of management issues including maintenance, repair, and replacement of food service equipment as well as planning support and training in these areas. The program, as envisioned, would be managed by the fleet and type command levels. The modular concept, the "Food Service Equipment Training Program", focuses strictly on training and would be used on a voluntary basis by the individual ships. In developing these alternatives, additional research was conducted and an approach determined as outlined below.

**Background:** A literature search was conducted of principal Navy and DoD documents that addressed the maintenance and management of material in general and food service equipment in particular. The effort included the following subject matter areas: Navy command and staff organization both ashore and on board ship, maintenance procedures, end item and spare part requisition/acquisition, supply and maintenance support at various levels of command, logistic databases and DoD logistic models and studies. The search identified publications, directives, instructions, and informal newsletters and bulletins from several Navy commands. Current success stories and lessons learned were used, thus ensuring an accurate picture of prevalent policies, programs and issues.

The maintenance of Navy equipment is directed and evaluated by a system of regulations and policies. Each succeeding level of command implements their own instructions based on directives and guidance received from higher levels. As a result, guidelines for the maintenance, repair and replacement of aboard ship food service equipment vary from fleet to fleet, type command to type command, and ship to ship. Current guidelines provided by the Navy for equipment management were taken into consideration when developing the alternatives and are listed in the reference section.

Additionally, the priority of food service has an impact on the effectiveness of its equipment management. Food service is generally afforded a lower priority when compared to other shipboard systems. Primary emphasis is placed on combat, propulsion and communications/radar systems, i.e. the systems that fulfill the ship's mission. The fact that food service is not currently classified as a "system" may exacerbate this situation.

Based on this research and the results of the Food Service Equipment Management Survey, critical areas were identified for which increased efficiency and effectiveness would exert maximum impact on food service equipment issues, return maximum benefits and most directly affect the quality of life of the sailor on board ship. These areas included fleet or major port-

based maintenance and material management assist teams, supervised hands-on training for operation, maintenance and repair of on-board food service equipment and the formation of shipboard cross-functional (Food Service and Engineering) maintenance and repair teams. In addition, individual ships need an information support system that can assist in status reporting, ordering equipment and forecasting repair requirements. The purpose and content of the alternatives developed were based on these findings.

Since the successful implementation of any alternative is dependent on the planning and preparation that supported its development, every effort was made to develop alternatives having a high potential of being implemented. A continuous effort was made throughout the project to construct the alternatives from the perspective of the end-user. The Food Service Equipment Management Survey, fleet visits, interviews, and reviews, coupled with the data collection and analysis approach used in this task, will ensure that all concerned and affected parties are actively involved in the development of alternatives. Also, since food service equipment management activities are interdependent (e.g. food service, supply, engineering; fleet, type command, individual ship) they must all be considered in the plan. The approach and methodology for development of the alternatives focused on coordinating requirements inherent in the food service equipment management structure with all parties to avoid overlap and conflicts and ensure that tasks are commensurate with capabilities.

The initial analysis focused on the level at which the proposed alternatives would be implemented. Based on background research and analysis of the Navy command structure, roles and missions, the levels of command were generally classified as follows:

**Strategic:** (e.g. Secretary of the Navy, CNO, Assistant Secretary for RD&A). Generally concerned with high-level policy and major systems acquisition.

**Operational:** (e.g. Naval Commands, CINC Atlantic and Pacific Fleet, Naval Supply Systems Command, Naval Sea Systems Command and the type commands). This level was seen as being concerned with resource management and direction, being the entities that furnished the wherewithal and programs that supported the tactical elements in accomplishing their missions.

**Tactical:** (Groups, Divisions, and individual ships). It is at this level that the orders, policies and programs of the higher commands are implemented.

It was decided to develop alternatives/recommendations that focus on the operational and tactical levels, as these are within the scope of this project. Given this framework, the results of the NRDEC survey, reports of interviews and results of the background research were analyzed to identify the current system for food service equipment management and determine the critical issues and processes at these two levels.

Based on discussions with key Navy personnel, the following assumptions were made and applied in the development of the food service equipment management alternatives:

- Proposed alternatives must rely on present resources.
- Competition for resources will continue to be intense.
- Service life of food service equipment will increasingly be extended by repair vs replacement of end items as a less expensive option.
- The Navy's mission requirements will remain the same or increase for the immediate future (1 - 3 years).
- Navy personnel strength and number of operational ships will decrease over the next 1 - 3 years.
- Frequency of ship deployments will increase while the duration of scheduled maintenance and overhaul availabilities will decrease.

## **Results**

### **Alternative 1: Food Service Equipment Technical Assistance Program**

**Background:** The "Food Service Equipment Technical Assistance Program" proposes a fleetwide program that provides fleet and type commands with extensive managerial, technical, logistic, and training support. Conversely, it affords less flexibility to the individual ships as compared with Alternative 2 the "Food Service Equipment Training Program". A combination of various ideas from AIRLANT's and AIRPAC's Enhanced Quality of Life programs (EQOL) has been used to develop a feasible program that may be instituted at various levels of a fleet's command structure.

**Program Components:** The "Food Service System Technical Assistance Program" is envisioned as a fleetwide program to be managed by the individual type commands. The program would be comprised of the following components:

- Develop/refine/update a database of each ship's food service equipment through a series of ship visits and equipment evaluations. The database would produce a detailed report of each piece of equipment and its status. It could be used to assist in the maintenance of equipment as well as for outyear planning of the phased replacement of equipment.
- Provide advanced planning support to the Supply Department during the ship's availability periods.

- Provide an out year maintenance plan (5 years) for the refurbishment, replacement, or repair of all shipboard food service equipment.
- Provide prepositioned repair parts and replacement equipment.
- Provide a cross functional training program for Food Service and Engineering personnel in the operation, maintenance and repair of food service equipment.
- Provide a program that would remove obsolete, inefficient and/ or no longer needed equipment based on input by ship class.
- Provide local technical support for small equipment, such as bread and meat slicers.

**Personnel Requirements:** This program would require qualified repair technicians who have extensive food service equipment maintenance knowledge and experience, and the ability to impart this knowledge to operational Navy personnel. As envisioned, the program would require, at a minimum, the following personnel:

Support Office	1 (Office staff)
Program Manager	2 ( Fleet liaison)
Coordinator	6 (1 Coordinator for each TYCOM for ship liaison)
Technicians	24 (12 Technicians each Coast)

The program would require a minimum of 12 technicians on each coast (preferably a team of 4-6 technicians in each major naval base location ) to evaluate shipboard food service systems. Evaluations would include a detailed report of each piece of equipment and its status. As previously noted, this information could be used to help forecast future equipment needs and provide input for outyear planning.

The same technical assistance teams would provide shipboard training, specific to the ship's needs, as part of their regular ship visits. In addition, the teams would offer additional training classes ashore for ship's personnel to attend. Ashore training would be more broadbased and would be provided to all ship commanders who want to train personnel on food service equipment preventative maintenance service and repair. This would ensure the continued success of the program as well as an increased cost savings to the Navy. This is a continuation of the training currently being provided by the Food Management Teams.

It is possible, that personnel from current Food Management Teams (FMTs) could be used to support this program. These personnel have the skills, experience and organization to implement this program. This would require a restructuring of the program coordination to include Naval Supply Systems Command (SUP 51). If other personnel are used they must have similar capabilities.

The following would be a typical example of a classroom training session:

**Oven, Baking and Roasting**

How to clean and care for the equipment

How to perform proper PMS of this equipment

How to trouble shoot equipment problems

How to repair or replace parts such as:

Thermostats

Timers

Heating Elements

**Alternative 2: "Food Service Equipment Training Program"**

**Background:** The "Food Service Equipment Training Program" provides a modular concept specifically focused on individual ships. Its main objective is to voluntarily provide ships with training for engineering and food service/supply personnel in the care, PMS, repair and replacement intricacies of food service equipment. Additionally, it contains provisions for equipment data collection and analysis and offers the option of technical assist visits.

**Program Components:** The "Food Service Equipment Training Program" would be used by the individual ships on a voluntary basis and would be comprised of the following components:

- Provide each ship with access to training for their Food Service and Engineering personnel. To accomplish, this a classroom teaching group would be developed at the primary naval facilities to provide deeper and more intensive training in food service equipment repair, preventative maintenance, trouble shooting techniques, proper equipment cleaning procedures and operator maintenance as well as equipment replacement techniques.
- Develop/refine/update a database of each ship's food service equipment through a series of ship visits and equipment evaluations. The database would produce a detailed report of each piece of equipment and its status. It could be used to assist in the maintenance of equipment and outyear planning of the phased replacement of equipment.
- Provide technical assist visits. (optional)

**Personnel Requirements:** This program will require qualified repair technicians who have

extensive food service equipment maintenance knowledge and experience, and the ability to impart this knowledge to operational personnel. As envisioned, the program would require, at a minimum, the following personnel:

Support Office	1 (Office Staff)
Program Manager	1 (Fleet Liaison)
Coordinator	2 ( 1 Coordinator for each Coast for ship liaison )
Technicians	8-10 ( 4-5 Technicians for each Coast )

The program requires 8-10 Technicians to evaluate equipment and teach personnel equipment maintenance. The analysis of equipment would become the basis of a database for outyear planning and would help develop/define a listing of future equipment needs.

The technicians would provide classroom training classes for ship's personnel to attend. Training would be provided to all ship's Engineering and Food Service personnel to learn the proper care, PMS, repair and replacement of equipment. This phase of the program would ensure continued success of the program and increase the potential for cost savings for the Navy.

As in Alternative 1, personnel required to support the program could be provided from current Food Management Team (FMT) assets with the concurrence and support of SUP 51.

Classroom training sessions would be similar to those provided in Alternative 1. Every piece of equipment carried by a type or class of ship would be covered in these classroom training sessions.

**Summary:** The ultimate goal of these programs is to improve the operational readiness of shipboard food service equipment both in port and while deployed. The programs have been designed to provide shipboard personnel with an enhanced ability to operate, maintain, repair and replace their food service equipment. The "Food Service Equipment Technical Assistance Program" is a fleetwide program providing the type commands with a standardized and continuous method for managing food service equipment aboard their ships. It would provide for training of food service and engineering personnel, an improved on board capability for food service equipment maintenance, readily available ashore support, and advanced planning including the phased replacement of equipment. Anticipated benefits of this program include substantial cost savings due to increased operational time for equipment, fewer replacements of equipment and more economical repair of equipment as a result of improved shipboard repair capabilities and ashore support. Additionally, the program could contribute to improving both readiness and morale. The "Food Service Equipment Training Program" provides a more conservative approach that focuses on training. The program would be used to provide individual ships access to classroom training for their Food Service and Engineering personnel. In addition, information on current equipment could be used for outyear planning would be provided. The benefits are similar to those of Alternative 1 but may be on a somewhat smaller scale. Anticipated benefits include cost savings as the ship's force becomes better able to maintain and repair their equipment and plan for its effective replacement, improved readiness and morale. A detailed cost/benefit analysis would need to be conducted in order to fully define the operating costs for these programs and the relative cost savings achievable through their implementation.

Recommendations from this study will be explored further under Military Service Requirement N 96-10, Vision 2010 - Modular Food Service Systems Concepts.

**Recommended Approach:**

The following approach could be used by the Navy, or a support contractor, to implement the Navy selected alternative. These steps would support the use of either or both alternatives as noted:

- Prepare correspondence (e.g., planning letters, personnel training confirmation letters) for approval. For Alternative 1, initial communication with the ship would be authorized by letter from the Type Commander. For Alternative 2, contact would be initiated by the ship.
- Conduct surveys of shipboard equipment.
- Develop training program and technician requirements.
- Develop/refine/update a database of food service equipment status to be used in planning and budgeting future equipment purchases.
- Prepare long range planning schedules and budgets for approval. (Alt 1)
- Monitor program, coordinate purchase of repair parts, material, and replacement equipment and expedite delivery as needed to support ship needs. (Alt 1)
- Perform shipboard technical training in conjunction with ship requests. (Alt 1)
- Perform deficiency visits on board ship to ascertain problems and notify ship of situations for action. (Alt 1 and Alt 2 upon request)
- Provide technician services for repairs. (Alt 1 and Alt 2 upon request)
- Provide teacher/technicians to perform classroom functions necessary to support program.
- Provide information for the purpose of updating existing ships documentation where necessary (i.e. for updates to ship's COSAL).
- Provide coordinator services throughout planning, engineering and repair or replacement phases of project. Monitor/coordinate contractor services and provide guidance to the ship's force. (Alt 1)

## **CONCLUSIONS**

The following conclusions are based on the survey data, interview summaries, literature searches, and professional experience:

- Current directives and policies for the maintenance and management of material for food service equipment are sound. Effectiveness and extent of implementation appears to vary by fleet, type command and individual ship.
- The maintenance of food service equipment appears to have very low priority on board ship compared to other ship systems (propulsion, combat, communications).
- Survey results indicate that air command personnel appear more involved, organized and effective in food service equipment maintenance than the surface command community. The submarine commands also appear to be more maintenance oriented than surface commands.
- Accurate data for food service equipment inventory, status, repair parts, and maintenance history are not readily available at the type command and individual ship/user-level.
- Forecasting of repair parts requirements appears to be weak.
- Ability of shipboard personnel (Engineering, Food Service) to operate, maintain, repair, replace, and manage food service equipment varies throughout the service, especially among type commands. This can be attributed, in part, to a lack of formalized training in food service equipment maintenance and repair.
- The maintenance of inventories of replacement items and spare parts is costly. Storage space, security and obsolescence are issues that cause increased cost and decreased readiness. Industry has recognized these issues and has begun to effectively address them through the concept of "Just in Time" (JIT) supply.

## **RECOMMENDATIONS**

The following recommendations are based on the analysis of the NRDEC survey results and background information. Several of the recommendations address issues that were not feasible for enclosure in the alternatives.

- Implement training programs at the operator/maintainer level that will enable shipboard personnel to conduct PMS and repairs on food service equipment both in-port and underway.
- Provide technical assistance at fleet or type command level in major ports to assist the ship's crew by providing training and, when necessary, technical supervision in maintenance of food service equipment.
- Develop/refine a database to support the management of food service equipment. Databases at all levels should be designed to share information. Current Navy supply data bases should be integrated into this system.
- Designate food service as a shipboard "system", similar to combat systems, propulsion, and communications. As part of this effort, a program could be initiated to consolidate the equipment and services that support the sailor's quality of life under a single ship's system, e.g. Quality of Life System. A number of areas could be addressed under this system including: food service, laundry, and berthing.
- Increase standardization in selected areas of maintenance management of food service equipment (e.g. equipment maintenance responsibilities, parts and end-item requisition, assistance and inspections, training, data collection and dissemination).
- Navy Decision makers must work with suppliers to push the concept of Just in Time(JIT) supply for food service equipment. The recent advent of customer value contracts (CVC) for food service equipment, offered through DGSC, supports this concept.

## TRANSITIONAL OBJECTIVES

The results of the Food Service Equipment Management Survey were presented to NAVSUP 51 in November, 1994. Based on this presentation, a decision was made to focus on the areas of parts support and training during the final year of this project. This will include:

- Defining the current system used for the acquisition of food service equipment, parts and support materials.
- Identifying potential streamlining applications for this acquisition system.
- Determining current training requirements and deficiencies.
- Developing training options.

A final report will be prepared and delivered to NAVSUP 51 in September, 1995.

This document reports research undertaken at the U.S. Army Soldier Systems Command, Natick Research, Development and Engineering Center and has been assigned No. NATICK/TR-95/029 in the series of reports approved for publication.

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# APPENDICES

## **APPENDIX A**

### **Navy Food Service Equipment Management Survey**

NAVY FOOD SERVICE EQUIPMENT MANAGEMENT SURVEY

SHIP TYPE & CLASS: \_\_\_\_\_ SHIP'S HOME PORT: \_\_\_\_\_

The U.S. Army Natick Research, Development & Engineering Center, as the executive agent of the DOD Food Program, has been tasked by the Navy to study food service equipment management practices (maintenance/repair/replacement) in order to recommend long term changes in these operations. In the past we have provided recommendations made by customers and workers to the Navy which have been implemented. Please take this survey seriously; we take your opinions seriously. Please read every question carefully and answer honestly. **THE ANSWERS YOU GIVE US IN THIS SURVEY ARE COMPLETELY CONFIDENTIAL.** If a question does not pertain to your specific job duties, please answer N/A. If you need additional space, please use the backs of these pages.

1. What is your grade? E-\_\_\_\_ O-\_\_\_\_ WO-\_\_\_\_

2. What is your rate? \_\_\_\_\_

3. How long have you been in the military? \_\_\_\_ years \_\_\_\_ months

4. How long have you been assigned/attached to this ship? \_\_\_\_ years \_\_\_\_ months

Have you been underway on this ship? YES NO

5. How would you describe your current job as it relates to food service equipment management? (PLEASE CIRCLE THE MOST APPROPRIATE ONE)  
Specific job title is optional.

a. Supply (Job Title: \_\_\_\_\_)

b. Engineering (Job Title: \_\_\_\_\_)

6. How long have you been in this position? \_\_\_\_ year(s) \_\_\_\_ months

7. What other experience do you have in food service equipment management?  
Please explain.

8. When was your last Food Management Team (FMT) or other assist  
visit? \_\_\_\_\_

If other, please specify by whom. \_\_\_\_\_

9. When was your last INSURV inspection? \_\_\_\_\_

10. When was your last LMA/SMA (Logistics/Supply Management  
Assessment)? \_\_\_\_\_

11. How would you describe the working relationship between Food Service and  
Engineering?

NEEDS IMPROVEMENT  
1

SATISFACTORY  
2

GOOD  
3

Briefly explain.

12. Do you feel there is adequate command level interest in food service:

Navy wide?	YES	NO	DON'T KNOW
Aboard this ship?	YES	NO	DON'T KNOW
In home port?	YES	NO	DON'T KNOW
Deployed?	YES	NO	DON'T KNOW

MANAGEMENT OF FOOD SERVICE EQUIPMENT

13. Does the ship have individuals from the Engineering Department specifically assigned to galley maintenance and repair? YES NO

14. Do these individuals report to Supply or Engineering? \_\_\_\_\_

I. Maintenance

15. How effective is the 3M system for accomplishing maintenance and collecting maintenance data for food service equipment? (PLEASE CIRCLE ONE)

NOT  
EFFECTIVE  
1

EFFECTIVE  
2

VERY  
EFFECTIVE  
3

Explain why.

16. Are spot checks conducted for Preventative Maintenance for food service equipment? YES NO

Who conducts them?

- a. Food Service
- b. Engineering
- c. Both

II. Repair

17. Is there currently a structured program/practice for managing the repair of food service equipment? YES NO

If YES, how effective is it? (PLEASE CIRCLE ONE)

NOT  
EFFECTIVE  
1

SLIGHTLY  
EFFECTIVE  
2

MODERATELY  
EFFECTIVE  
3

VERY  
EFFECTIVE  
4

18. Briefly explain how the program for managing repair operates and why it is effective or ineffective.

19. What percentage of food service equipment repairs are:

Mechanical \_\_\_\_%      Electrical \_\_\_\_%      AC & Refridg. \_\_\_\_%

20. Who prioritizes food service equipment repair needs?

21. Are there readily available technical manuals for food service equipment repair?

YES      NO

If YES, are these manuals up-to-date?    YES      NO

22. Who has copies of these manuals? ( Engineering, Food Service, Technical Library, other) \_\_\_\_\_

23. How useful are these manuals?

NOT AT ALL  
USEFUL  
1

SOMEWHAT  
USEFUL  
2

VERY  
USEFUL  
3

24. In the event of equipment failures, how often do you research if equipment is under warranty before you initiate the repair?

NEVER	ALMOST NEVER	SOMETIMES	OFTEN	ALWAYS
0	1	2	3	4

25. Who is responsible for documenting equipment deficiencies?

- a. Supply
- b. Engineering
- c. Both

26. Is the use of Eight O'clock Reports effective or ineffective? \_\_\_\_\_

27. How often are repair parts readily available aboard this ship?

NEVER	ALMOST NEVER	SOMETIMES	OFTEN	ALWAYS
0	1	2	3	4

28. If repair parts are not readily available, please explain what you have to do to order them?

29. What percentage of food service equipment on your ship is COSAL supported?  
(Please circle one answer)

Less than 25%	25-50%	50-75%	75-100%
---------------	--------	--------	---------

30. When you order spare parts, how responsive is the system to your request?

NOT RESPONSIVE AT ALL 1	SOMEWHAT RESPONSIVE 2	MODERATELY RESPONSIVE 3	VERY RESPONSIVE 4
----------------------------------	-----------------------------	-------------------------------	-------------------------

Navy wide.....	1	2	3	4
----------------	---	---	---	---

Aboard this ship.....	1	2	3	4
-----------------------	---	---	---	---

In home port.....	1	2	3	4
-------------------	---	---	---	---

Deployed.....	1	2	3	4
---------------	---	---	---	---

Comments:

31. When the food service equipment repair is beyond the capabilities of the ships' force, what option(s) do you generally use to get it repaired?

(Circle all that apply)

- a. We just replace it
- b. SIMA
- c. Waterfront contract
- d. Call the manufacturer
- e. Assist visits
- f. Other \_\_\_\_\_

32. If the system is not adequately responsive, where do you think the breakdown happens?

33. How does deployment affect this process? Please explain and give an example if you can.

34. In your opinion, what are the top three management problems related to food service equipment ~~repair~~? (Please explain how or why the system fails, not specific equipment problems)

### III. Replacement

35. Is there currently a structured program/practice for managing the ~~replacement~~ of food service equipment?    YES            NO            DON'T KNOW

If YES, how effective is it? (PLEASE CIRCLE ONE)

NOT  
EFFECTIVE  
1

ADEQUATELY  
EFFECTIVE  
2

VERY  
EFFECTIVE  
3

Briefly explain how equipment is ordered.

36. What are some of the more effective practices you have worked with?

37. Are there any standard regulations/guidelines to follow when replacing food service equipment?

YES NO DON'T KNOW

If YES, are they adequate? YES NO DON'T KNOW

Do they need to be updated? YES NO DON'T KNOW

38. How is replacement of equipment scheduled?

a. In advance

b. As needed

c. Other \_\_\_\_\_

39. Do you have a copy of the shipboard food service equipment catalog on board?

YES NO

40. Who prioritizes food service equipment replacement needs?

41. Before equipment is replaced is there an attempt to repair it? YES NO

If YES, how successful are these attempts?

RARELY  
SUCCESSFUL  
1

SOMEWHAT  
SUCCESSFUL  
2

ALMOST ALWAYS  
SUCCESSFUL  
3

ALWAYS  
SUCCESSFUL  
4

In home port..... 1 2 3 4

Deployed..... 1 2 3 4

42. Are manufacturers' technical assistance programs available?    YES            NO

Do you use them?    YES            NO

43. In your opinion, what are the top three management problems related to food service equipment ~~replacement~~? (Please explain how or why the system fails, not specific equipment problems)

44. Please use the following scale to rate your views on changes that may improve food service operations.

	NOT IMPORTANT 1	IMPORTANT 2	EXTREMELY IMPORTANT 3
a. Warranty information & usage	1	2	3
b. Better quality equipment	1	2	3
c. More equipment	1	2	3
d. Better parts support	1	2	3
e. Improved acquisition support	1	2	3
f. Self-diagnostic equipment	1	2	3
g. Greater emphasis on preventative maintenance	1	2	3
h. More recognition for a job well done	1	2	3
i. Training for FS personnel in equipment operation and cleaning	1	2	3
j. Training for Eng. Dept. personnel in food service equipment repair	1	2	3
k. More expert help with equipment	1	2	3
l. Standardizing equipment (same for each class of ships)	1	2	3
m. Dedicated repair personnel for food service	1	2	3

45. If you feel more expert help is needed, please indicate what type of help you would like to have. (CIRCLE ALL THAT APPLY)

- a. Information hotline
- b. More Assist visits
- c. Shipboard training sessions
- d. Ashore training sessions
- e. On site support from equipment manufacturer(i.e. service reps)
- f. Waterfront contracts
- g. Video training
- h. Other \_\_\_\_\_

46. Please list any pieces of food service equipment that give you consistent trouble in your job, are permanently out of service, or are rarely used. Briefly describe the kind of problem you experience with the equipment.

NAME OF EQUIPMENT(MAKE/MODEL #)

PROBLEM

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

47. On average, what percentage of your food service equipment is up and running?

Less than 25%

25-50%

50-75%

75-100%

48. What new equipment would you like to added to your mess? Please be specific.

IV. TRAINING

49. Do you feel there is adequate training available in food service equipment maintenance and repair?      YES      NO

What type of training is provided:

In home port? \_\_\_\_\_

Deployed? \_\_\_\_\_

50. What additional type of training would you like to have?

51. What priority is training in food service equipment given? (CIRCLE ONE)

- a. There is no training at all
- b. Very low priority
- c. Moderately low priority
- d. Medium priority
- e. Moderately high priority
- f. Very high priority

52. Do you feel food service equipment impacts on the quality of the food?

YES      NO

How?

53. What is the most common limiting factor for the repair of food service equipment? (Prioritize top three)

- a. \_\_\_\_ Identifying the problem
- b. \_\_\_\_ Getting engineering to respond to the trouble call
- c. \_\_\_\_ Getting the right person from engineering to respond
- d. \_\_\_\_ Identification of required parts
- e. \_\_\_\_ Obtaining parts
- f. \_\_\_\_ Budget
- g. \_\_\_\_ Other \_\_\_\_\_

54. What is the most common cause of food service equipment failures? (Prioritize top three)

- a. \_\_\_\_ Improper operation
- b. \_\_\_\_ Improper cleaning
- c. \_\_\_\_ Improper preventative maintenance
- d. \_\_\_\_ Lack of preventative maintenance
- e. \_\_\_\_ Excessive use
- f. \_\_\_\_ Not properly adapted to shipboard use
- g. \_\_\_\_ Lack of parts support
- h. \_\_\_\_ Other \_\_\_\_\_

55. Is accessibility for cleaning, maintaining and/or repairing of food service equipment a problem?

USUALLY	OFTEN	SOMETIMES	RARELY	NEVER
A	A	A	A	A
PROBLEM	PROBLEM	PROBLEM	PROBLEM	PROBLEM
1	2	3	4	5

56. Do you feel the management of food service equipment on this ship is typically:

VERY	SOMEWHAT	NEUTRAL	SOMEWHAT	VERY
PROACTIVE	PROACTIVE		REACTIVE	REACTIVE
1	2	3	4	5

THANK YOU FOR YOUR HELP.

## **APPENDIX B**

### **Types of Training Requested**

## Appendix B

Write-in Responses to Survey Question 50: "What additional type of training would you like to have?"

FORMAL OJT

1 WEEK FORMAL SCHOOL WOULD BE NICE

1.EQUIPMENT OPERATION & EQUIPMENT TRAINING 2. REPAIR/MAINTENANCE TRAINING

2 WKS "C"SCHOOL, EQUIP TRAINING SAME WITH LAUNDRY EQUIP

4790/CK FORM FILL-OUT TRAINING

A COMPREHENSIVE COURSE ON PURCHASING

A COURSE FOR FS PERSONAL & ENG IN USE & MAINT OF EQUIP

A DESIGNATED FS GROUP OF PERSONNEL ASSIGNED TO FS DIVISION

A NAVY CLASS "C" SCHOOL

A-GANG TO COME AND DO TRAINING

A-SCHOOL, C-SCHOOL WITH NEC

A-SCHOOL, DEDICATED "GALLEY GEAR" SCHOOL

ACR EXPORTABLE TRAINING IS NEEDED FOR NEC TO SMALL PART

ADDITIONAL TRAINING ON DISHWASHER TROUBLE SHOOTING/REPAIRS

AIR COND.& REFRIGERATION, ELECTRICAL REPAIRS

ALL TYPE OF FSE

ALL TYPES FOR A/E/R/MS'S/AND MAA'S

ALLOW SERVICE REP TO TRAIN IN PURCHASINGS

ANY

ANY FORMAL SCHOOL TYPE OF TRAINING

ANY TRAINING AT ALL

ANY TRAINING AT ALL

ANY WOULD BE NICE

ASSIST VISIT FROM GROOMING TEAM

ASSIST VISITS WORK WELL

ASSIST VISITS

BASIC EQUIPMENT REPAIR

BASIC OPERATION STANDARD OPERATING PROCEDURES DISA & REP

BASIC OPERATION,TYPICAL BREAKDOWNS RELATED SYMPTOMS TS

BETTER TECH MANUALS

BETTER/MORE TRAINING ON SPECIFIC EQUIPMENT

C, D, E, F, & G ON QUESTION 45

C-SCHOOL

CLASS ROOM

CLASSES TAUGHT BY CIVILIAN FROM THE MANUFACTURER

CLASSROOM HANDS ON

CONTRACTOR TRAINING ON REPAIR OF THEIR EQUIPMENT

CONTROL MECHANISM TRAINING FOR PMS

COOK SHOULD GO TO REPAIR SCHOOL TO FIX OVEN, GRILL,TOASTER

COOKS TO KNOW MORE ABOUT PREVENTATIVE MAINTENANCE

COURSES ON DISASSEMBLY, TROUBLE SHOOTING, ELECTRICAL FAILS

DEDICATED GALLEY TEAMS WITH TRAINING

DEEP CLEANING ELECTRICAL EQUIP.

DEEP FAT FRYER AND FRISBO MACHINE MAINTENANCE

DEEP FAT FRYER, GAYLORD

DEEP FAT FRYER, GAYLORD HOOD

DISHWASHING MACHINE AND MORE DEEP FRYER OPERATION

ELECTRICAL TROUBLESHOOTING ESP ON DRYER & SCULLERIES

ELECTRICAL TROUBLESHOOTING, BASIC CARE AND REPAIRS

EM PERSONAL TRAINING ON GAYLORD SYSTEM & MAINT. FOR MESS SPECIALIST  
 EN,EM,MM,IC,PIPELINE TRAINING  
 ENG  
 ENG DO SPEC TRAINING W/FS PERSONEL ON SPEC EQUIP  
 ENG SHOULD BE CERTIFIED TO WORK ON EQUIPMENT  
 ENG SPECIFIC GALLEY EQUIP, MS BASIC PREVENTATIVE MAINTAINENCE  
 ENG TRAIN ALL MS'S IN EQUIP CLEAN EQUIP  
 ENG TYPE TRAINED IN FS TO VISIT & DO TRAININGS  
 ENGINEERS GIVING TRAINING OJT  
 EQP NOT USUALLY SUPPORTED OPEN PURCHASED  
 EQUIP SPECIFIC (MFG) TRAINING  
 EQUIPMENT OPERATION, MAINTENANCE  
 EQUIPMENT TRAINING CLASS ON OPERATION AND MAINTENANCE  
 EXPERT ASSIST, IMA &PMT SUPPORTED ASSIST VIDEO TRAINING  
 FACTORY OR COMPANY REPRESENTATIVE TRAINING  
 FACTORY SCHOOL, FACTORY REPS  
 FLEETWIDE PROGRAM FOR ASHORE AND AFLOAT.  
 FOR ENGINEERS TO HAVE MAINTENANCE AND REPAIR.  
 FOR MS'S ADV CULINARY TRAINING HOTEL MANAGEMENT COLLEGE  
 FORMAL  
 FORMAL CLASSROOM TYPES W/TECH MANUALS-TROUB SHOOTING  
 FORMAL SCHOOL AND SHIPBOARD  
 FORMAL SCHOOL TRNG  
 FORMAL SCHOOL W/NEC'S; MAKE IT MANDATORY  
 FORMAL SCHOOLING IN THE PIPELINE  
 FORMAL SCHOOLS FOR STANDARD GALLEY EQUIPMENT  
 FROM MANUFACTURER REP  
 FS EQUIP REPAIR, TRAINING MANAGERS, TRAINING FOR ENG&MS  
 FS EQUIP REPAIR W/ AN ENGINEERING NEC CODE  
 FS REPAIR SCHOOL  
 FSA TRAINING ON PROPER USE  
 FSA TRNG, MORE ASSIST VISITS  
 FORMAL TRAINING IN OPERATION & MAINTENANCE OF GALLEY & LAUNDRY EQUIPMENT  
 GALLEY EQUIP TRAINING IN A-SCHOOL  
 GALLEY EQUIPMENT REPAIR  
 GALLEY GEAR SPECIFIC COURSE FOR EM'S&EN'S  
 GALLEY SAFETY ON EQUIP, TR ON SCULLERY, DEEP FAT FRYER, MEAT SLICER  
 GAYLORD SYSTEMER  
 GENERAL MAINTENANCE AND TROUBLESHOOTING  
 GENERAL SMALL UNIT A/C&R TROUBLESHOOTING  
 GALLEY OVENS, AUX EQPT, MEAT+FOODSLICERS, KETTLES  
 HANDS ON FROM MANUFACTURING  
 HANDS ON TRAINING  
 HANDS ON TRNG BY THE MANUFACTURER  
 HANDS ON W/TECH DEPT  
 HAVE C.O. REP DO TRAINING ON THEIR EQUIPMENT  
 HOW TO PROPERLY CLEAN PMS EQUIPMENT  
 HOW TO TROUBLESHOOT MORE EFFECTIVLY  
 HOW TO USE IT  
 HANDS ON TRAINING  
 HANDS ON W/TECHREP-HOW EQPT WORKS, USE TECHMANS, LOGIST VERIFIC  
 IF EQUIP WAS STANDARDIZED CLASSROOM TRAINING ON BOARD  
 IMPLEMENTED INTO DIVISIONAL TRAINING PROGRAM

IN-HOUSE OJT  
 INCLUDE TRAINING FOR BASIC MNTNC FOR EM'S & AUXINASCHOL  
 INVOLVED ALL HANDS BOTH MSS AND ENGR  
 LMS&MSLPO BSC MNTNCE & RPLCMNT NEEDS  
 LOTS MORE WE HAVE NONE  
 MAINTENANCE SCHOOL  
 MAINTNCE TRNG FOR OPERATORS.  
 MANU LED TRAINING OF ENG, PMS GUIDELINES OF EQUIP  
 MANUF TRAINING  
 MANUF TRAINING ON USE AND MAINTENANCE  
 MANUF REPS GIVING HANDS ON TRNG.  
 MANUFACTURER CONDUTED "HANDSON" TRNG.  
 MANUFACTURER GIVE OPERATOR/MAINTENANCE TRNG, VIDEOS  
 MANUFACTURER RELATED/SUPPORTED  
 MANUFACTURER REP TRNG.  
 MANUFACTURER SPECIFIC TRAINING BY MANUFACTURER TECHREPS  
 MANUFACTURER TRAIN A-GANG ON PROPER MAINTENANCE  
 MANUFACTURER TRAINING ON SPECIFIC EQUIP  
 MANUFACTURER TRNG  
 MANUFACTURER TRNG  
 MANUFACTURER'S REP.ON-SITE TRAINING  
 MANUFACTURERS  
 MANUFACTURES SEMINARS, TECH REPS ONE ON ONE  
 MAUFACTURERS'SHIPBOARD TRAINING VISITS  
 MESS COOK TRAINING  
 MESS SPECIALIST TRAINING  
 MFG & NAVY WIDE INFO LTRS ON PROBLEM EQUIP  
 MFG REPS CONDUCT TRAINING  
 MFG REPS TRAIN PERSONEL PROPERLY  
 MFG REPS TRAIN US  
 MFG SERVICE REPS TO GO OVER TRBLSPOTS ON EQUIP  
 MFG SERVICE SCHOOLS W/SERVICE MANUALS AVAILABLE.  
 MFG TRAINING ON BOARD SHIP  
 MFG TROUBLESHOOTING TECHNIQUES  
 MFG'S REP TRAINING SESSIONS  
 MFG'SREP VISITS, EXPERT ASSEEMENT&PLANNING OF LAYOUT  
 MFGS REPS  
 MFMT  
 MFNT WORKSHOPS, MANDATORY ATTENDANCE FOR 2 ENG  
 MFR REPAIR SCHOOLS  
 MORE ASSIST VISITS FROMTHE COMPANIES.  
 MORE CONTRACTOR TRNG, MANUFACTURED SPONSORED TRNG.  
 MORE EQUIPMENT SPECIFIC  
 TRAINING  
 MORE EXPORTABLE TRAINING  
 MORE FOOD SERVICE EQP TRAINING  
 MORE FREQUENT ON ALL EQUIPMENT  
 MORE O.J.T. ON MAINTENANCE  
 MORE SHORE SCHOOL  
 MORE TECH REP ASSISTANCE AVAILABLE.  
 MORE TECHNICAL ASSIST PROGRAMS  
 MORE TRAINING  
 MORE TRAINING FOR ENG.PERSONNELONMAINT.&REPAIR&FORMS'S



PACKAGE UNIT A/C AND R  
 POINT OF CONTACT (I.E. TYCOM) IMMEDIATE EXPECT HELP  
 PREVENTATIVE MAINTENANCE FOR THE OPERATOR.  
 PREVENTATIVE MAINTENANCE OF EQUIP, SAFETY OF PERSONAL  
 REEFERS - ELEVATORS  
 REPAIR TRAINING TO WORK ON OUR OWN EQUIP  
 REPS FROM COMPANY  
 REPAIR TRAINING FOR EACH SPECIFIC Piece of eqpt  
 SCHOOLS AVAILABLE FOR JR PERSONNEL.  
 SCHOOLS FOR REPAIRMEN  
 SCHOOLS ON GALLEY EQP OPERATION, MAINT AND REPAIR  
 SEMI-ANNUAL TRAINING  
 SEND ELECTRICIANS TO SAME SCHOOL AS AC&R PEOPLE.  
 SEND ENG PERSNL TO SCHOOL AND ATTACH THEM TO SUPPLY.  
 SERVICE SCHOOL TRNG IS SUFFICIENT.  
 SERVICING THE EQUIP  
 SHIP BOARD CLASS FOR ENG PERSNL  
 SHIP BOARD TRAINING ON SPECIFIC EQUIP  
 SHIP TRAINING SESSIONS, ASHORE TRAINING, VIDEO TRAINING  
 SHIPBOARD COMPANY REP, TEACH, VIDEO, HAND ON A/E DIV FS  
 SHIPBOARD OJT W/EQUIP MFG, VIDEOS FOR EACH PIECE OF EQU  
 SHIPS TRNG AND ASSIST VISITS  
 SHORE TRAINING SESSIONS FOR PERSON WHO MAINTAIN EQUIP  
 SHORT COURSE OF HOW TO REPAIR GALLEY EQUIP  
 SHORT SCHOOL OFFSHIP/ONSHIP SPECIFIC ATRAINING ASSITS  
 SHORT TREM SCHOOL FOR REPAIR OF GALLEY EQUIPMENT  
 SM PACKAGING UNITS REPAIR (ICEMACH)  
 SMALL APPLIANCE REPAIR  
 SOME SCHOOLS  
 SPECIFIC EQUIPMENT OPERATION/REPAIR.  
 SPECIFIC TRAINING ON F/S EQUIP REPAIR  
 T/S OF SOLID STATE EQUIPMENT  
 TEACH COOK SHOW TO OPERATE/CARE FOR EQUIP DURING PIPELINE TRAIN  
 TEAM ASSIST  
 TECH ASSIST BY SEAMAT  
 TECH ASSIST FROM MANUFACTURER  
 TECH ASSIST WHEN S/F CANT FIX SO S/F CAN LEARN OJT  
 TECH ASSISTS  
 TECH ASSISTS ONBOARD  
 TECH REP  
 TECH REP ASSIST  
 TECH REP AT THE ENGINEERING SCHOOL  
 TECH REP FROM CO. COULD BRING PUBS & GIVE TRAININGS  
 TECH REP GIVE TRAINING TO REPAIR DEPT PERSONNEL ON EQUI  
 TECH REP ONCE NEW PIECE IS INSTALLED  
 TECH REPRESENTATIVE FROM MANUFACTURER ON EQUIP  
 TECH REPS TRAINING MAINTENANCE PERSONNEL  
 TECH TRAINING  
 TECH REPS. W/HANDOUTS FOR SHIPS FORCE MAINT. MEN  
 TECHNICAL REPRESENTATIVE TRAINING  
 TECHNICAL TRAINING  
 TECHNICAL TRAINING WHEN POSSIBLE BY THE MANUFACTURER  
 TRAIN FS PERSNL TO FIX OWN EQPMNT.

TRAIN FSA'S ON EQUIPMENT USEAGE AND REPAIR  
 TRAIN OF MAINT PERS&OP OFF SHORE NOT INTERFER ON SHIP  
 TRAIN W/ MANUF REPS WITH GALLEY MAINT & MS  
 TRAIN4:ICE MACHINES,SMALL REFRIG, LAUNDRY EQPT  
 TRAINING  
 TRAINING BY EQ MAN  
 TRAINING FOR ELECTRICIANS IN GALLEY EQUIP REPAIR  
 TRAINING FOR FS PERSONNEL IN PROPER OP OF EQUIP  
 TRAINING FROM FS AND VISE VERSA  
 TRAINING FROM MANUFACTURED VIDEO OR ON BOARD CLASSROOM  
 TRAINING FROM MANUFACTURER ON SPECIFIC SHIPBOARD EQUIP  
 TRAINING IS ADEQUATE, AVAILABLE PERSONNEL IS A PROBLEM  
 TRAINING MANUAL WITH EACH NEW PIECE OF EQP  
 TRAINING ON ALL EQUIPMENT  
 TRAINING ON CLEANUP AND HANDLING.  
 TRAINING ON CONTROL, OPERATION AND CLEANING FOR OPS  
 TRAINING ON CORRECT USAGE BY NFMT OR OTHER MS'S  
 TRAINING SPECIFIC TO EACH TYPE OF GEAR  
 TRNG FOR COOKS ON PROPER OPERATION/UPKEEP  
 TRNG FOR ENG DEPT  
 TRNG FROM MS'S WOULD BE NICE.  
 TRNG FROM THE MANUFACTURER  
 TRNG ON EQPMNT TROUBLESHOOTING AND REPAIR/MAINTENANCE  
 TRNG ON USAGE AND BASIC REPAIR  
 TROUBLE SHOOTING  
 TROUBLE SHOOTING + REPAIR OF REFRIGERATION EQUIP  
 TROUBLE SHOOTING ELEC/MECHANICAL REPAIRS-PARTS SUPPORT  
 TROUBLE SHOOTING TECHNIQUES  
 TROUBLE SHOOTING W ENG  
 TROUBLE SHOOTING/REPAIR  
 TROUBLESHOOTING PROCEDURES.  
 TRAINING FOR MSS TO REPAIR EQPT  
 TRAINING FOR TECHS  
 USE&PMS TRAINING FOR MS, MFG REPAIR TRN FOR ENG  
 VENDOR TRNG ON SPECIFIC EQPMNT REPAIR  
 VIDEO TAPES ON EQUIP REPAIR AND OPERATION  
 VIDEO TRAINING ON SPECIFIC EQP  
 VIDEO TRAINING-TROUBLESHOOT TECHNIQUES  
 VIDEO TRNG  
 VIDEO, ASSIST VISITS  
 VIDEO, TECH REPS  
 VIDEOS  
 VIDEOS OR WRITTEN GUIDE ON TROUBLE SHOOTING  
 VIDEOS, VENDOR INSTRUCTION  
 VJENO'S TEAM ASSIST.SHIPBOARD TRAINING BY MANUFACTURER  
 VIDEOS, MANUFACTURER MEETINGS WITH REPAIR PERSONNEL  
 VISITS ABOARD SHIPS  
 W/GOOD TECHNICAL MAN & SUFFICIENT TIME ANYONE CAN FIX  
 W/STANDARDIZATION SEND ELECTRICIANS TO MFG REP SCHOOL  
 ON-BOARD TRAINING, MAINTENANCE OF DEEP FAT FRYER, FOOD WARMER, REACH-IN FREEZER

## APPENDIX C

### List of Acronyms

AC&R - AIR CONDITIONING & REFRIGERATION  
AEL - ALLOWANCE EQUIPMENT LIST  
APL - ALLOWANCE PARTS LIST  
ASSR - AUXILIARY SHIPS SYSTEMS REVIEW  
CEMAT - CARRIER ENGINEERING MAINTENANCE ASSIST TEAM  
CINC - COMMANDERS IN CHIEF  
CLER - CARRIER LIFE ENHANCING REPAIRS  
CNAP - COMMANDER NAVAL AIR PACIFIC  
CNO - CHIEF OF NAVAL OPERATIONS (OP-04)  
CO - COMMANDING OFFICER  
COMNAVAIRLANT - COMMANDER NAVAL AIR FORCE, U.S. ATLANTIC FLEET  
COMNAVAIRPAC - COMMANDER NAVAL AIR FORCE, U.S. PACIFIC FLEET  
CONFORM - CONCEPT FORMULATION GROUP  
COSAL - COORDINATED SHIPBOARD ALLOWANCE LIST  
CPO - CHIEF PETTY OFFICER  
CSMP - CURRENT SHIP'S MAINTENANCE PROJECT  
CVC - CUSTOMER VALUE CONTRACT  
DGSC - DEFENSE GENERAL SUPPLY CENTER  
DLA - DEFENSE LOGISTICS AGENCY  
DPMA - DEPOT PRE MAINTENANCE ACTIVITY  
DRMO - DEFENSE REVITALIZATION MATERIAL OFFICE  
DSRA - DRYDOCK SHIP RESTRICTED AVAILABILITY  
EDF - ENLISTED DINING FACILITY  
EM - ELECTRICIAN'S MATE  
EQOL - ENHANCED QUALITY OF LIFE  
ESR - ENGINEERING SERVICES REQUEST  
ET - ELECTRONICS TECHNICIAN

FISC - FLEET INDUSTRIAL SUPPLY CENTER

FOSSAC - FITTING OUT & SUPPLY SUPPORT ASSISTANCE CENTER

FMT - FOOD MANAGEMENT TEAM

FSA - FOOD SERVICE ATTENDANT

FSD - FOOD SERVICE DIVISION

FSO - FOOD SERVICE OFFICE

ILO- INTEGRATED LOGISTICS OVERHAUL

ILR - INTEGRATED LOGISTIC REVIEW

ILS - INTEGRATED LOGISTIC SUPPORT

IMA - INTERMEDIATE MAINTENANCE ACTIVITY

IMIP - INVENTORY MANAGEMENT IMPROVEMENT PROGRAM

IMMS - INTERMEDIATE MAINTENANCE MANAGEMENT SYSTEM

INSURV - BOARD OF INSPECTION & SURVEY

ISSOP - INTRAFLEET SUPPLY SUPPORT OPERATIONS PROGRAM

ISSOT - INTRAFLEET SUPPLY SUPPORT OPERATIONS TEAM

LCMP - LIFE CYCLE MAINTENANCE PLANNING

LMA - LOGISTIC MANAGEMENT ASSESSMENT

3M - (SHIPS) MAINTENANCE & MATERIAL MANAGEMENT SYSTEM

MDMAA - MESSDECK MASTER-AT-ARMS

MDS - MAINTENANCE DATA SYSTEM

MLSF - MOBILE LOGISTICS SUPPORT FORCE

MM - MACHINISTS MATE

MRC - MAINTENANCE REQUIREMENT CARD

MS - MESS MANAGEMENT SPECIALIST

NAMSO - NAVY MAINTENANCE SUPPORT OFFICE DEPARTMENT

NAVSSO - NAVY FOOD SERVICE SYSTEMS OFFICE

NAVMASO - NAVY MANAGEMENT SYSTEMS SUPPORT OFFICE

NAVSEALOGCEN - NAVAL SEA LOGISTICS CENTER

NAVSEACENs - NAVAL SEA SUPPORT CENTERS

NAVSEASYSKOM - NAVAL SEA SYSTEMS COMMAND

NAVSUP - NAVY SUPPLY

NEC - NAVY ENLISTED CODE

NOB - NAVAL OPERATING BASE

NRCC - NAVY REGIONAL CONTRACTING CENTER

NSC - NAVAL SUPPLY CENTER

OPNAV - NAVAL OPERATIONS

OPNAV 4790/2K - SHIP'S MAINTENANCE ACTION FORM

OPNAV 4790/CK - SHIP'S CONFIGURATION CHANGE FORM

OPTAR - OPERATIONAL TARGET ALLOWANCE

OMMS - ORGANIZATIONAL MAINTENANCE MANAGEMENT SYSTEM

PERA-CV - OFFICE OF PLANNING & ENGINEERING REPAIR AIRCRAFT CARRIERS

PMRs - PERIODIC MAINTENANCE REQUIREMENTS

PMA - PHASED MAINTENANCE AVAILABILITY

PMR - PLANNED MAINTENANCE REQUIREMENT

PMS - PLANNED MAINTENANCE SYSTEM

PQS - PERSONAL QUALIFICATION STANDARDS

POT/I - PRE OVERHAUL TEST & INSPECTION

PRRP - PHASED RENOVATION & REPAIR PROGRAM

RAS - REPLENISHMENT AT SEA

RA/TA - RESTRICTED AVAILABILITY/TECHNICAL AVAILABILITY

RDO - REPAIR DUTY OFFICER

RSG - READINESS SUPPORT GROUP

REFTRA - REFRESHER TRAINING

S2 - ENLISTED FOOD SERVICE DIVISION

SS - WARD ROOM FOOD SERVICE DIVISION

SAM - SHIP'S AVAILABILITY MANAGEMENT

SEAMAT - SURFLANT ENGINEERING & MAINTENANCE ASSIST TEAM

SEL's - SELECTED EQUIPMENT LISTS

SHIPALTS - SHIP ALTERATIONS

SIMA - SHIP INTERMEDIATE MAINTENANCE ACTIVITY

SLEP - SERVICE LIFE EXTENSION PROGRAM

SMI - SUPPLY MATERIAL INSPECTION

SNAP - SHIPBOARD NON-TACTICAL AUTOMATED DATA PROCESSING PROGRAM

SPAWARSCOM - SPACE & NAVAL WARFARE SYSTEMS COMMAND

SPCC - SHIPS PARTS CONTROL CENTER

SRA - SHIP RESTRICTED AVAILABILITY

SUPSHIPS - SUPERVISOR OF SHIPBUILDING, CONVERSION AND REPAIR

SYSKOM - SYSTEM COMMAND

TYCOM - TYPE COMMAND

UPK - UPKEEP

VRL - VENDOR RECOMMENDED LIST

XO - EXECUTIVE OFFICER

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